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WESTERN BIRDS

Volume 7, Number 3, 1976

BEHAVIOR OF LATE-NESTING BLACK SKIMMERS AT SALTON SEA, CALIFORNIA

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The Black Skimmer *(Rynchops niger)* was first found nesting at the south end of Salton Sea, Imperial County, California in 1972 (McCaskie et al. 1974). Five nests were found in 1972, three in 1973 (McCaskie 1973), and three in 1974 (McCaskie 1974). Nesting had been suspected at the north end of the sea, but was not confirmed until 16 August 1975 when the authors, Sandra Grant and Jeanne Hogg discovered eight nests on a small barnacle-covered island in the northeast corner of the sea. Biweekly visits were made to the island and several aspects of their breeding behavior are reported here.

RESULTS

Nests. When first discovered, the 20 m x 40 m island was about 15-20 cm above water level. It is doubtful that nesting could have occurred there in June and early July (all previous egg dates of the skimmer at Salton Sea fall within this time period) as the island was probably submerged then. Evaporation exceeds irrigation effluent in late June-July and the sea level falls from then until about December. The nesting site was about 50 m southeast of the end of Grant Street drain in the Whitewater Cove area of Salton Sea, Riverside County. The unvegetated island was made primarily of Acorn Barnacle *(Balanus amphitrite)* shells with a few shells of a freshwater snail *(Helisoma sp.)*. Eight nests with eggs were found on 16 August and by 30 August five more nests had been added (Table 1). On these early visits several empty scrapes were found.

The mean depth of the 13 active nests was 64 mm (range 40-90 mm) and the mean diameter was 296 mm (range 260-400 mm). No lining, other than the seashells present, was added. Nests were placed along the higher contours of the island and proximity to the nearest neighbor

Table 1. Population counts and nesting data of Black Skimmers at the north end of the Salton Sea in 1975.

	Adults	Flying Juv.	Nest-lings	Scrapes with Eggs	Eggs in Scrapes	Eggs Out of Scrapes	Total Eggs and Nestlings
16 Aug	37	1	0	8	14	0	14
30 Aug	39	2	0	13	38	4	42
13 Sep	48	1	8	–	17	10[1]	35
27 Sep	46	4	8[2]	–	193[3]		27

1. Includes 2 eggs punctured probably by heron or gull
2. Includes 1 chick (1 day old) dead near nest
3. Includes 3 eggs punctured by skimmers

seemed haphazard; mean distance was 242 cm (range 135-457 cm). The distance from the nests to the water ranged from 1 m to about 10 m.

A behavior in skimmers was observed that seems similar to the "choking behavior" illustrated by Tinbergen (1960:59, 60, 76) for the Herring Gull *(Larus argentatus)* and the Laughing Gull *(L. atricilla).* The male and female skimmers standing near a scrape often faced each other, pointed the bill nearly vertically downward and rhythmically moved the head up and down. From our observation point, we were unable to distinguish any vocalizations associated with this behavior. This behavior was observed in several pairs of skimmers, but choking was not observed in more than one pair at a time. Choking preceeded several episodes of digging by one pair of skimmers at the site of an unfinished scrape on 16 August. Skimmers formed the nest scrape by lowering the breast, raising the tail, and kicking barnacle shells outward with the feet. After several kicks the bird moved to another position within the scrape and kicked outward again. To a casual observer it might be assumed that a scrape is formed by slowly spinning around on the breast feathers but this would cause excessive abrasion of the feathers (Tomkins 1933).

Eggs. The mean clutch size of the 13 nests was 2.9 (range 1-4 eggs). Eggs found outside of scrapes (4 on 30 August; Table 1) were not included in this calculation. They may have come from some of the 13 nests, from an empty scrape, or laid inadvertently away from the bird's scrape. Preston (1962) reported a skimmer laying an egg aboard his boat while it was stranded on a bar near a nesting colony of skimmers and terns. We measured and weighed 38 eggs on 30 August. The mean length was 45.4 mm (range 40.5-50.0 mm), mean width was 34.1 mm (range 31.5-36.0 mm), and the mean weight was 26.8 g (range 22.0-32.5 g). Egg weights were not all fresh weights as 14 eggs were known to be at least 14 days old. Unfortunately, we had no means of numbering eggs and nests nor weighing eggs on our first visit. Egg dimensions agree well with those reported by Bent (1921)

Between 13 and 27 September skimmers evidently punctured three eggs with their knife-like bills (Figure 1). These eggs were outside of scrapes when found and it is not known whether nesting or non-nesting birds were responsible. Inside one punctured egg was a well-formed embryo. Eggs were displaced from nests of late-nesting skimmers in Louisiana (Chamberlain 1959), but it was not indicated whether any eggs had been punctured. Bongiorno (1968) found Laughing Gulls puncturing eggs of their own species when their nests had been displaced by a storm.

Incubation. Both sexes incubate, but much variation occurred. It was hot (34-38°C) and nest relief occurred every 3-4 minutes when we first discovered the colony on 16 August. Our initial disturbance may have caused the rapid nest relief. It was at this time that we observed "foot-wetting" (Turner and Gerhart 1971) and other cooling mechanisms (to be discussed more fully elsewhere). Three nests were watched closely on 30 August from 1543 to 1820 to determine the amount of incubation by each sex (Table 2). Tomkins (1933) and Bent (1921) felt that females did all of the incubating and Pettingill (1937) felt these chores were shared equally. Modha and Coe (1969) reported that in the African Skimmer *(Rynchops flavirostris),* the parents took turns incubating. Sexes can be determined in the field by size differences. The male appears larger both on the ground and in the air (when both sexes are

Figure 1. Punctured egg of Black Skimmer at Salton Sea, California.
Photo by G. S. Grant

Table 2. Percentage of incubation performed by each sex from 1543 to 1820 on 30 August 1975.

	Male	Female	Uncovered
Nest No. 6 (4 eggs)	6.5	86.1	7.4
Nest No. 12 (3 eggs)	38.9	53.5	7.6
Nest No. 13 (3 eggs)	19.1	71.3	9.6

present for critical comparison). The maximum interval of uncovered eggs was 3 minutes. During the heat of the day a short interval of disturbance may prove lethal for the eggs. To minimize disturbance most of our observations were made from a boat anchored offshore and examination of eggs and young was limited to early morning and late afternoon visits.

Incubating birds oriented into the wind, almost without exception, but in still air orientation with respect to other skimmers was random. From 0715 to 1100 on 27 September all skimmers were facing into a NW wind (tail to sun) regardless of whether incubating, brooding, or in a resting flock. From 1100 to 1130 no wind occurred and bird positions were random. At 1130 the wind came from the SE and all birds faced into the wind and sun. Our observation position was unchanged during this time interval. Wind flow over the feather surface facilitates heat loss by convection. Ruffled feathers and orientation into the wind were important behavioral adjustments for desert nesting Gray Gulls *(Larus modestus)* in Chile (Howell et al. 1974).

Figure 2. Some heat loss mechanisms of the Black Skimmer. Note panting; elevated crown, nape, and scapular feathers; shading of legs and feet; and slightly drooped and outward displaced wings. *Photo by G. S. Grant*

Panting, elevated crown, nape, and scapular feathers, slightly drooped and outward displaced wings, and shading of feet and legs were frequently used heat loss mechanisms (Figure 2) of nesting skimmers in this stressful environment. Shade temperatures above 40°C and ground temperatures above 50°C are often encountered here.

Nestlings. Intense solar radiation dictates egg coverage during the egg-laying stage and asynchronous hatching would be expected. Even if the eggs were only shaded during the egg-laying stage, some development within the egg would probably occur because of the high ambient temperatures encountered here. One pair brooded three chicks and there was at least 24 hours difference in the age of each one. Tomkins (1933) also reported incubation beginning with the first egg laid and chicks hatching a day or so apart. Measurements and weights were obtained on all chicks captured. The upper and lower mandibles are about the same length at hatching and in chicks weighing up to 300 g only 1 mm difference was detected. In the largest chick (340.5 g), the lower mandible extended 3 mm beyond the upper. This individual was near fledging age. Uneven bill lengths would handicap the feeding ability of chicks, especially if the food item fell to the ground during the exchange from the parent's bill to the chick, as also suggested by Bent (1921) and Modha and Coe (1969). A rapid growth of the lower mandible occurs at fledging or shortly afterward as the bill lengths of flying juveniles that we saw appeared similar to those of the adults. We have no data on the extent of parental feeding during this intermediate stage. Feeding of the young was not observed during our visits, but discarded Sailfin Mollies *(Peocilia latipinna)* were found in some of the scrapes. Skimmers feed primarily at dusk and at night and presumably the young are not fed during the day at Salton Sea.

Four chicks were banded on 13 September and four more on 27 September with the hope of learning something about their wintering area. On 27 September we recaptured two of the previously banded chicks, but the other two could not be found. One chick and two eggs were lost to avian predators and 15 other eggs and/or young were not accounted for between 30 August and 27 September (Table 1). A chick, about one day old, that was found dead on 27 September (specimen to UCLA) had a gaping hole at the base of its neck which was probably inflicted by a heron or gull.

Skimmers were observed feeding in the Whitewater River delta region of Salton Sea as late as 13 October.

Behavior toward nest markers. Sixteen numbered, wooden tongue depressors (152 mm x 19 mm x 2 mm), with red paint applied to the top 20 mm, were placed about 15 cm from the nest scrapes on 30 August. Almost immediately some birds began actively removing these markers, and by 27 September only one marker of the original 16 remained upright. Seven others were scattered in the vicinity of nests

and one of these had been displaced over 5 m. The remaining eight were no longer present on the island. To investigate color responses we placed five variously colored tongue depressors from 15 cm to 1 m from a nest scrape (one egg and two chicks in scrape) on 13 September. Within one hour the pair (male in all the cases where sex was determined) had knocked down or flown off with all markers in the following order and approximate distance placed from the nest: black (30 cm), yellow (30 cm), green (15 cm), blue (1 m), red (65 cm). The vertical component of the marker was not the sole stimulus as they repeatedly attempted to lift markers lying flat on the ground near the nest. We attempted to duplicate this experiment on 27 September but the birds did not respond to markers placed near the nests. Adult attentions were directed toward the more mobile chicks rather than to the nest sites on this date. With our limited data it would be premature to speculate on the significance of this behavior.

DISCUSSION

Skimmers characteristically nest later than most terns and gulls on the Atlantic seaboard, with most egg dates coming from mid-May to late July (Bent 1921). The African Skimmer (Britton and Brown 1974) breeds mainly in April-May at Lake Rudolf, Kenya, but elsewhere in East Africa they breed on exposed sandbanks of rivers where egg-laying begins in June but may continue into September during the dry season (Attwell 1959). Falling water and exposure of sandbanks has been suggested as the nesting stimulus for the Black Skimmer along the Amazon River (Preston 1962). Late-nesting skimmers were studied in Louisiana where the majority of eggs did not hatch until 18 August (Chamberlain 1959). Chamberlain suggested the late nesting was probably due to a second nesting effort. At the south end of Salton Sea, Black Skimmers successfully raised one young by mid-August 1975 (McCaskie 1975). Any nests placed in the drift or high water line are subjected to flooding by rising water levels until late June-July or by wind-driven water at any time during the summer. Skimmers nesting at the north end were probably unsuccessful in an earlier nesting attempt in 1975 along the shoreline of the sea.

Nesting success of this species might be enhanced by constructing small islands that remain above June and July water levels at both ends of the sea. Islands kept relatively clear of vegetation and at a suitable distance from land to prevent predator and human access should prove acceptable to skimmers seeking nest sites in June. Nest sites available early in the season would allow nesting relatively free of gull predation. Gull numbers increased sharply after the first week in July 1975 at the north end of the sea.

It is interesting to speculate on this sudden influx of skimmers into California. One wonders about habitat destruction in the Gulf of California, persecution by man, and change in food availability. Two breeding colonies in Sonora and several colonies in Sinaloa (Friedmann et al. 1950) are the only recorded nesting locations for northwestern Mexico. About three-fourths of the annual precipitation in Sonora and northern Sinaloa falls between June and September, mainly in July and August (Anon. 1965). The first summer record of the Black Skimmer for California occurred on 3 July 1968 (McCaskie and Suffel 1971). Perhaps unusually heavy rains destroyed skimmer nests in northwestern Mexico in 1968 and were responsible for the 1968 skimmer influx into Salton Sea. Rainfall for Guaymas, Sonora in July 1968 exceeded the mean July precipitation by a factor of 2.5 (Anon. 1965, 1968). However, June 1968 had only a trace and we do not know how much rain occurred between 1 and 3 July 1968.

ACKNOWLEDGMENTS

The authors thank Sandra Grant for her astute observations first calling attention to the possibility of nesting and for typing several drafts of this manuscript, Jeanne Hogg for aid in the field, and Kimball Garrett and Thomas R. Howell for comments on an early draft of this paper.

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COLORADO FIELD ORNITHOLOGISTS OFFICIAL RECORDS COMMITTEE REPORT 1972 THROUGH 1975

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The Colorado Field Ornithologists established an Official Records Committee in May 1972 to deal primarily with the problem of validating sight reports of rare and unusual species occurring in Colorado, and to review records of species reported for the first time from within the state. In addition, the Records Committee was charged with updating and maintaining the Official State List of the Birds of Colorado. Current members of the Records Committee are Jack Reddall (Chairman), Robert Andrews, David A. Griffiths, Harold R. Holt, Dr. Paul R. Julian, Hugh E. Kingery, and Richard Stransky. The following voting procedures have been used since the Records Committee was formed. For species new to the state, if all members of the Committee agree that the bird was correctly identified, the record is accepted. For rare or unusual species, if all members or all but one of the members agree that the bird was correctly identified, the record is accepted. During its first three and one-half years of operation, the Records Committee reviewed a total of 465 individual reports of rare and unusual species and approved 384, for an acceptance rate of 83%. Apparently this rate compares favorably with that experienced by the California Field Ornithologists Records Committee in its first three years of operation. During this same period the Records Committee also reviewed a total of fifty reports of species occurring for the first time within Colorado. Only fourteen of these were found to be acceptable, for a much lower level of acceptance (28%).

The following is the first report from the Official Records Committee covering its activities for the period 1972 through 1975. A few words of explanation regarding the preparation of this report are in order. At the outset the Records Committee decided to use the *Birds of Colorado* (Bailey and Niedrach, Denver Museum of Natural History, 1965) as a point of departure in order to formulate an Official State List of the Birds of Colorado. Consequently a cursory review of all species included by Bailey and Niedrach was undertaken. Those species which in the judgment of the Records Committee were found to have been included on the basis of very meager and unconvincing details were arbitrarily dropped. Introduced species which have not clearly established themselves in the state were also dropped from the list. Seven additional species lost status due to the "lumping" process coincident with the publication of the 32nd Supplement to the AOU Check-list. Having reached this point the Records Committee set about to gather and review data for all reports (published or otherwise) of species not on the revised State List. This has evolved into a continuing process and as

of 31 December 1975 the Official State List of the Birds of Colorado totaled 425 species. Additional reports are still under consideration.

Part two of this report depicts the accepted and unaccepted records for new species occurring within Colorado primarily from 1965 through the end of 1975. The file number assigned to each is in parentheses along with initials of the observers who submitted written or photographic documentation. No attempt has been made to identify all the observers involved with each record. All the reports are on file with the Records Committee Chairman and are available upon request.

Part three of this report lists those records found acceptable and unacceptable for rare and unusual species which were not new to the state. Records are grouped according to the year in which they were received irrespective of the year of observation. As in part two, the file number assigned to each record is in parentheses along with the initials of the observers submitting documentation. All reports in this part are also on file with the Chairman of the Records Committee. The list of rare and unusual species for which the Records Committee is currently interested in receiving documentation follows part three. This listing is reviewed and updated once a year.

INITIAL RULINGS

The Official Records Committee, at its First General Meeting in Durango on 18 May 1973, ruled that the following species included by Bailey and Niedrach (1965) as having occurred in the state be dropped due to insufficient or unconvincing details:

White Ibis *(Eudocinus albus)*
Black Vulture *(Coragyps atratus)*
Harris' Hawk *(Parabuteo unicinctus*
Spruce Grouse *(Canachites canadensis)*
Black Rail *(Laterallus jamaicensis)*
Western Gull *(Larus occidentalis)*
Arctic Tern *(Sterna paradisaea)*
Ground Dove *(Columbina passerina)*
Carolina Parakeet *(Conuropsis carolinensis)*
Pileated Woodpecker *(Dryocopus pileatus)*
Wheatear *(Oenanthe oenanthe)*

The Official Records Committee also ruled that the following introduced species included by Bailey and Niedrach (1965) have not clearly established themselves in Colorado and therefore were dropped from official status as occurring in the state:

Mute Swan *(Cygnus olor)*
California Quail *(Lophortyx californicus)*
Red-legged Partridge *(Alectoris rufa)*
Gray Partridge *(Perdix perdix)*

At its Second General Meeting in Denver on 9 March 1974, the Official Records Committee ruled to drop the following additional four species due to insufficient or unconvincing details:

Caracara *(Caracara cheriway)*
Inca Dove *(Scardafella inca)*
Hooded Oriole *(Icterus cucullatus)*
Scott's Oriole *(Icterus parisorum)*

Finally, with the advent of the 32nd Supplement to the AOU Check-list, seven additional species were dropped due to "lumping":

Blue Goose merged with Snow Goose
Harlan's Hawk merged with Red-tailed Hawk
Red-shafted and Yellow-shafted flickers merged as Common Flicker
Audubon's and Myrtle warblers merged as Yellow-rumped Warbler
Baltimore and Bullock's orioles merged as Northern Oriole
Slate-colored, White-winged and Oregon juncos merged as Dark-eyed Junco

NEW SPECIES REPORTED FROM COLORADO 1972-1975

ACCEPTED RECORDS

LITTLE GULL *(Larus minutus)*. One adult in winter plumage (N-23-45) 2-10 Nov 1974, Union Res., Weld Co. (RA, JAC, ND, HH, SL, JR, BrW). Photo on file.

CASPIAN TERN *(Hydroprogne caspia)*. One adult (N-32-42) 27-28 May 1974, Lake Henry, Ordway, Crowley Co. (DAG, SO, JR, VT). Photo on file.

ANNA'S HUMMINGBIRD *(Calypte anna)*. One male (N-31-4) 28 Aug-9 Sep 1966, Hotchkiss, Delta Co. (EB, TC).

BLUE-THROATED HUMMINGBIRD *(Lampornis clemenciae)*. One female (N-31-7) 29 Jun-4 Aug 1972, Colorado Springs, El Paso Co. (DAB). Photo on file.

BLACK PHOEBE *(Sayornis nigricans)*. One pair (N-34-11) 13 May-12 Aug 1972, 15 mi. SW of Pueblo along the St. Charles R., Pueblo Co. (DBr, CAG, MSc). Photo on file.

WHITE-EYED VIREO *(Vireo griseus)*. One (N-51-38) 10 May 1974, Two Buttes Res., Baca Co. (UCa, PJ, HK, DS).

BLUE-WINGED WARBLER *(Vermivora pinus)*. One (N-52-43) 9-10 May 1970, Waterton, Jefferson Co. (HK, CK, WCR).

HERMIT WARBLER *(Dendroica occidentalis)*. One male (N-52-52) 8 May 1975, Pueblo, Pueblo Co. (VT).

PRAIRIE WARBLER *(D. discolor)*. One male (N-52-51) 10 May 1975, Waterton, Jefferson Co. (PJ, HK, AS).

LOUISIANA WATERTHRUSH *(Seiurus motacilla)*. One (N-52-55) 1-2 Jun 1975, Cottonwood Canyon, Baca Co. (LW).

KENTUCKY WARBLER *(Oporornis formosus)*. One male (N-52-20) 31 May-21 Jun 1963, Chatauqua Park, Boulder, Boulder Co. (LH).

SCOTT'S ORIOLE *(Icterus parisorum)*. One first year male (N-54-53) 1-3 May 1975, Red Rocks Park, Morrison, Jefferson Co. (JRC, VR).

GREAT-TAILED GRACKLE *(Cassidix mexicanus).* One male (N-54-23) 16 May through mid-August 1970, Gunnison, Gunnison Co. (ASH, REM, DRa). Photo on file.

SMITH'S LONGSPUR *(Calcarius pictus).* "Up to 100" (N-56-32) 23-25 Sep 1973, 3 mi. N of Briggsdale, Weld Co. (WB, JRC, NH, LW).

UNACCEPTED RECORDS

YELLOW-BILLED LOON *(Gavia adamsii).* One immature (N-1-56), an unsexed specimen (DMNH No. 7808) collected on 7 Nov 1922, Adams Co. by F. S. Smith. Following a re-examination of this skin, it was determined to be that of a Common Loon *(Gavia immer)* (see Binford and Remsen, Western Birds 5:111-126, 1974). The Yellow-billed Loon has been dropped from the Official State List of the Birds of Colorado.

BLACK VULTURE *(Coragyps atratus).* One (N-9-40) 20 Jul 1954, Great Sand Dunes National Monument, Alamosa Co. One (N-9-40) during June 1956, Great Sand Dunes Natl. Mon., Alamosa Co. Ten (N-9-40) 7 Jun 1966, Great Sand Dunes Natl. Mon., Alamosa Co. One (N-9-58) 21 Jul 1975, 5 mi. NE of Gunnison, Gunnison Co. NOTE: Two additional records reported from Colorado Natl. Mon. 19 Sep 1963 and 14 Sep 1964 have proved to be unfounded.

GRAY HAWK *(Buteo nitidus).* One (N-10-1) 24 Apr 1972, Lookout Mountain, Jefferson Co.

HARRIS' HAWK *(Parabuteo unicinctus).* One (N-10-46) 5 Sep 1974, Pawnee Natl. Grassland, Weld Co.

PURPLE GALLINULE *(Porphyrula martinica).* One male (N-17-61) secured on 17 Jun 1911, Florence, Fremont Co. Following a re-examination of this skin by Dr. Allan R. Phillips and J. V. Remsen, Jr., it was determined to be most probably a caged bird.

RUFF *(Philomachus pugnax).* One (N-19-2) 13 Sep 1964, Cherry Creek Res., Arapahoe Co.

CASPIAN TERN *(Hydroprogne caspia).* Two (N-23-3) 27 and 30 Apr 1958, Monte Vista NWR, Rio Grande Co.

GROOVE-BILLED ANI *(Crotophaga sulcirostris).* One (N-26-50) 23 Apr 1975, 1 mi. N of Golden, Jefferson Co.

VAUX'S SWIFT *(Chaetura vauxi).* One (N-30-28) 29 Oct 1972, about 5 mi. W of Delta, Delta Co.

RUBY-THROATED HUMMINGBIRD *(Archilochus colubris).* One (N-31-31) 20-22 May 1975, Marshdale, Jefferson Co.

ALLEN'S HUMMINGBIRD *(Selasphorus sasin).* One (N-31-5) 30 Jul-5 Sep 1972, Rock Creek Park, Colorado Springs, El Paso Co. Three (N-31-6) 15 Aug 1972, Colorado Spring, El Paso Co. One (N-31-44) during August and the first two weeks of September 1974, Gunnison, Gunnison Co.

BUFF-BELLIED HUMMINGBIRD *(Amazilia yucatanensis).* One (N-31-8) 7 Aug 1970, Golden, Jefferson Co.

WHITE-EARED HUMMINGBIRD *(Hylocharis leucotis).* One (N-31-9) 23 Jul 1963 on Grand Mesa, Mesa Co.

"GILDED" FLICKER *(Colaptes auratus chrysoides).* One (N-33-10) 19-24 Dec 1972, Colorado Springs, El Paso Co.

PILEATED WOODPECKER *(Dryocopus pileatus).* One (N-33-49) 12 Oct 1974, between Laporte and Fort Collins, Larimer Co.

ROSE-THROATED BECARD *(Platypsaris algaiae).* One (N-33A-41) 12 May 1973, Pine, Jefferson Co.

BEARDLESS FLYCATCHER *(Camptostoma imberbe).* Single birds 10 Jun 1962, 23 Apr 1963 and 15 Sep 1964 (collectively filed under N-34-12), Mesa Co.

"BLACK-EARED" BUSHTIT *(Psaltriparus "melanotis").* Two (N-38-13) 28 Jul 1972, 3 mi. S. of Canon City, Fremont Co.

WRENTIT *(Chamea fasciata).* One (N-40A-54) 1 Jun 1975, at the base of Arthur's Rock just west of Horsetooth Res. (elev. 6000'), Fort Collins, Larimer Co.

CACTUS WREN *(Campylorhynchus brunneicapillus).* One (N-42-14) 11 Jun 1968, Campo, Baca Co. One (N-42-29) 17 Jul 1968, 5 mi. W of Pueblo, Pueblo Co.

WHITE-EYED VIREO *(Vireo griseus).* One (N-51-15) 11-14 May 1972, Boulder, Boulder Co.

BLUE-WINGED WARBLER *(Vermivora pinus).* One (N-52-16) 23 May 1961, Golden, Jefferson Co. One (N-52-39) 18 Sep 1965, Barr Lake, Adams Co.

"LAWRENCE" WARBLER *(Vermivora "lawrencei").* One (N-52-30) 14 May 1963, Golden, Jefferson Co.

OLIVE WARBLER *(Peucedramus taeniatus).* One (N-52-17) 23 May 1970, McCoy, Eagle Co.

HERMIT WARBLER *(Dendroica occidentalis).* One (N-52-18) 12 May 1963, Golden, Jefferson Co.

LOUISIANA WATERTHRUSH *(Seiurus motacilla).* One (N-52-19) 11 May 1968, Bonny Res., Yuma Co.

TRICOLORED BLACKBIRD *(Agelaius tricolor).* One (N-54-32) 18-20 Apr 1969, Colorado Springs, El Paso Co.

HOODED ORIOLE *(Icterus cucullatus).* One (N-54-64) 14 May 1970, Colorado Springs, El Paso Co.

SCOTT'S ORIOLE *(Icterus parisorum).* One pair (N-54-36) 12 May 1973, along Rock Creek, Eagle Co.

HOARY REDPOLL *(Acanthis hornemanni).* Three (N-56-24) 21 Feb 1964, Golden, Jefferson Co.

BLACK-CHINNED SPARROW *(Spizella atrogularis).* One (N-56-37) 15 Dec 1973, Boulder, Boulder Co.

SMITH'S LONGSPUR *(Calcarius pictus).* "Several" (N-56-25) 29 Apr 1966, Bonny Res., Yuma Co.

CONTRIBUTORS

Robert Andrews (RA), Dominic A. Bartol, Jr. (DAB), Edith Blide (EB), Donna M. Bregenzer (DBr). Winston W.Brockner (WB), Urling Cannon (UCa), Theodora S. Colborn (TC), Jeanne Conry (JAC), John R. Cooper (JRC), Narca DeWoskin (ND), Claire A. Griffiths (CAG), Dave A. Griffiths (DAG), Louise Hering (LH), Harold R. Holt (HH), Nancy Hurley (NH), Dr. A. Sidney Hyde (ASH), Paul R. Julian (PJ), Hugh E. Kingery (HK), C. Edward Knittle (CK), Steve Larson (SL), Richard E. Marquardt (REM), Stanley W. Oswald (SO), Don Radovich (DRa),

Jack Reddall (JR), Van Remsen (VR), Willis C. Royall, Jr. (WCR), Michael Schultz (MSc), Allen Stokes (AS), Douglas Stotz (DS), Van A. Truan (VT), Bruce Webb (BrW), Lois E. Webster (LW).

1972 ACCEPTED RECORDS

ARCTIC LOON *(Gavia arctica).* Two (1-72-1) 8-13 Nov 1972, Cherry Creek Res., Arapahoe Co. (WC, JRC, HH, JAL, JR). One (1-72-21) 30 Sep-1 Oct 1972, Blue Mesa Res., Gunnison Co. (ASH, DRa).

LITTLE BLUE HERON *(Florida caerulea).* One adult (5-72-11) 1 Aug 1971, C.F.&I. Lakes, Pueblo, Pueblo Co. (VT).

CATTLE EGRET *(Bubulcus ibis).* One adult (5-72-29) 20 Apr-30 May 1971, Barr Lake, Adams Co. (HH). Photo on file.

LOUISIANA HERON *(Hydranassa tricolor).* One adult (5-72-31) 25 Jul 1971, Barr Lake, Adams Co. (HH, JR, VR). Probably the same bird was observed on 1 Aug 1971 at the Mile High Duck Club, Adams Co. Photo on file.

ROSS' GOOSE *(Chen rossii).* One (8-72-12) 21-23 Apr 1972, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG, VT).

RED KNOT *(Calidris canutus).* One (19-72-22) 13 May 1972, Lake Henry, Crowley Co. (MSc). Photo on file.

BUFF-BREASTED SANDPIPER *(Tryngites subruficollis).* One (19-72-17) 27 Apr 1971, C.F.&I. Lakes, Pueblo, Pueblo Co. (VT). One (19-72-37) 22 Aug 1972, Big Johnson Res., El Paso Co. (MSc). Photo on file.

RED PHALAROPE *(Phalaropus fulicarius).* One in winter plumage (21-72-18) 13-15 Apr 1972, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG, VT).

VARIED THRUSH *(Ixoreus naevius).* One (44-72-8) 27 Nov-28 Dec 1972, Lakewood, Jefferson Co. (JRC, JAL, BNo, RO). Photo on file.

WOOD THRUSH *(Hylocichla mustelina).* One (44-72-35) 13-15 Sep 1972, Grand Junction, Mesa Co. (LE).

YELLOW-THROATED VIREO *(Vireo flavifrons).* One (52-72-38) 24-25 Apr 1971, along the Republican R. below Bonny Dam, Yuma Co. (HK).

PHILADELPHIA VIREO *(V. philadelphicus).* One (51-72-24) 18 Aug 1972 along the Gunnison R. 5 mi. NE of Gunnison, Gunnison Co. (ASH).

GOLDEN-WINGED WARBLER *(Vermivora chrysoptera).* One male (52-72-33) 9 Jun 1968, Muir Springs Park, Morgan Co. (RA, HH, JR). Photo on file.

CAPE MAY WARBLER *(Dendroica tigrina).* One male (52-72-26) 10 May 1964, Kittredge, Jefferson Co. (HH). Photo on file.

PAINTED BUNTING *(Passerina ciris).* One male (56-72-20) found stunned 2 May 1972; released same day and remained in the area until 10 May 1972, Pueblo, Pueblo Co. (DBr, DAG, VT). Photo on file.

SNOW BUNTING *(Plectrophenax nivalis).* One (56-72-34) 31 Dec 1972 about 10.6 mi. due S of the 1-76 interchange 1 mi. W of Wiggins, Morgan Co. (JR, VR). Two (56-72-40) 31 Dec 1972-1 Jan 1973 about 8 mi. N or Red Feather Lakes, Larimer Co. (DBo). Photo on file.

1972 UNACCEPTED RECORD

SNOW BUNTING *(P. nivalis).* One (56-72-7) 3 Nov 1972, Denver Federal Center, Lakewood, Jefferson Co.

1973 ACCEPTED RECORDS

ARCTIC LOON *(Gavia arctica).* Two (1-73-133) 18 Nov 1973, Cherry Creek Res., Arapahoe Co. (JR).

RED-THROATED LOON *(G. stellata).* One (1-73-142) 15 Dec 1973, Marston Res., Jefferson Co. (HH, JR, VT).

CATTLE EGRET *(Bubulcus ibis).* One (5-73-31) 21 Apr 1968, Lake Henry, Crowley Co. (VT). One (5-73-6) 19 Aug 1972, 12 mi. SE of Eads, Kiowa Co. (DAG). Two (5-73-7) 12 Oct 1972, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG). One (5-73-63) 1 May 1973, Monte Vista NWR, Rio Grande Co. (PHRS).

LEAST BITTERN *(Ixobrychus exilis).* One (5-73-117) 22 May 1971, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG). One (5-73-81) 12 May 1973, Bonny Res., Yuma Co. (PJ).

ROSS' GOOSE *(Chen rossii).* One (8-73-8) 22 Apr 1972, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG).

EUROPEAN WIGEON *(Anas penelope).* One immature male (8-73-9) shot by a hunter 24 Oct 1970 on a small pond SW of Walsenburg, Huerfano Co. (DAG, VT). The skin was not saved.

RUFFED GROUSE *(Bonasa umbellus).* One gray-phased adult (13-73-26) 4 Jun 1971 about 9.75 mi. SE of Hayden, Routt Co. (PNL).

WHOOPING CRANE *(Grus americana).* Four adults and one immature (16-73-132) 3 Nov 1973, Greeley, Weld Co. (JFC).

PIPING PLOVER *(Charadrius melodus).* One (18-73-34) 29 Aug 1971, C.F.&I. Lakes, Pueblo, Pueblo Co. (VT). One (18-73-67) 11-12 May 1973, Lake Cheraw, Otero Co. (VT).

RED KNOT *(Calidris canutus).* One (19-73-111) 3 Sep 1973, 1.5 mi. S of Barr Lake, Adams Co. (LW).

SHORT-BILLED DOWITCHER *(Limnodromus griseus).* One (19-73-90) 11 Aug 1973, 112th Avenue and Chambers Road, Adams Co. (HH, JR). Photo on file. One (19-73-108) 19 Aug 1973, Antero Res., Park Co. (HK).

BUFF-BREASTED SANDPIPER *(Tryngites subruficollis).* One (19-73-22) 6 Oct 1968, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG). One (19-73-56) 11 May 1973, Idalia, Yuma Co. (JRC).

POMARINE JAEGER *(Stercorarius pomarinus).* One adult (22-73-45) 12 May 1973, Lake DeWeese, Custer Co. (SL, VT). Photo on file. One adult (22-73-124) 6 Oct 1973, Prospect Res., Weld Co. (JR).

PARASITIC JAEGER *(S. parasiticus).* One (22-73-115) 20 Sep 1973, Cherry Creek Res., Arapahoe Co. (HH). Photo on file. One (22-73-143) 17 Dec 1973, Cherry Creek Res., Arapahoe Co. (RA).

LEAST TERN *(Sterna albifrons).* Two (23-73-116) 17 Aug 1969, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG). One (23-73-118) 22 Aug 1970, Lake Maria, 5 mi. E of Walsenburg, Huerfano Co. (DAG).

BLUE-THROATED HUMMINGBIRD *(Lampornis clemenciae).* One female (31-73-74) 7 Sep 1970, Evergreen, Jefferson Co. (WB). NOTE: This record predates the first accepted occurrence for this species for Colorado (July and August 1972 at Colorado Springs, El Paso Co.). At the time that this report was received one-observer sight reports were not admissable for first state records. The Records

Committee has since changed its criteria to accept well documented one-observer sight reports from bona fide observers. One male (31-73-88) 28 Jun-22 Jul 1973, Shadow Mountain, Grand Co. (EPC). One male (31-73-104) 1 Aug 1973, Fruita, Mesa Co. (SL).

BLACK PHOEBE *(Sayornis nigricans).* One pair (34-73-102) 21 Apr-6 Sep 1973 along the St. Charles R., Pueblo Co. (DAG, VT). Photos on file.

EASTERN WOOD PEWEE *(Contopus virens).* One (34-73-98) banded 3 Jun 1973, Lykin's Gulch, 8 mi. W of Longmont, Boulder Co. (AC).

VERMILION FLYCATCHER *(Pyrocephalus rubinus).* One male (34-73-52) 29 Apr 1973, Horse Creek Res., Weld Co. (HH).

GRAY-CHEEKED THRUSH *(Catharus minimus).* One (44-73-113) found dead 15 May 1973 after apparently having flown into a picture window, Fort Collins, Larimer Co. (GSw). Identification of specimen verified by Dr. Kenneth Parkes, Carnegie Museum, who classified it as *Catharus minimus aliciae.* First Colorado specimen (Colorado State University No. 9856).

YELLOW-THROATED VIREO *(Vireo flavifrons).* One (51-73-51) 12 May 1973, Boulder, Boulder Co. (ABC).

PROTHONOTARY WARBLER *(Protonotaria citrea).* One male (52-73-75) 3-4 May 1973, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAS, VT).

WORM-EATING WARBLER *(Helmitheros vermivorus).* One (52-73-12) 29-30 Apr 1967, Waterton, Jefferson Co. (HK). One (52-73-119) 29 Apr 1973, 10 mi. NW of Pueblo, Pueblo Co. (DAG). One (52-73-70) 11 May 1973, 5 mi. N of Rye, Pueblo Co. (VT).

GOLDEN-WINGED WARBLER *(Vermivora chrysoptera).* One (52-73-25) 20-21 May 1972, Bear Canyon, Boulder Co. (DAG, PJ). One (52-73-28) 5 May 1973 along the Cimarron R., Baca Co. (HK, PJ).

CAPE MAY WARBLER *(Dendroica tigrina).* One male (52-73-48) 2-3 May 1973, Boulder, Boulder Co. (HPC, ABC, SL).

BLACK-THROATED BLUE WARBLER *(D. caerulescens).* One male (52-73-64) 13 Sep 1970, Pueblo, Pueblo Co. (VT). One male (52-73-41) 16 May 1973, Northern Colorado Nature Center east of Fort Collins, Larimer Co. (KSt). One male (52-73-126) 14 Oct 1973, Waterton, Jefferson Co. (UCa, HK).

BLACK-THROATED GREEN WARBLER *(D. virens).* One female (52-73-89) 3 May 1973, Boulder, Boulder Co. (SL). One male (52-73-42) 3 May 1973, Sawhill Ponds, Boulder, Boulder Co. (DBB, MM, PM). One male (52-73-30) 5 May 1973, Red Rocks Park, Morrison, Jefferson Co. (RR).

BLACKBURNIAN WARBLER *(D. fusca).* One female (52-73-137) caught in a mist net 13 Oct 1973, Spring Canyon Dam, 3.5 mi. S and 3 mi. W of Fort Collins, Larimer Co. (RB); recaptured at same location 17 Oct 1973 (RB).

BAY-BREASTED WARBLER *(D. castanea).* One male (52-73-57) 20 May 1973, Stanley Heights, Estes Park, Larimer Co. (LM). One female (52-73-127) 23 May 1973, Lower Dixon Dam, 4.3 mi. SE of Fort Collins, Larimer Co. (DL). One male (52-73-99) 3 Jun 1973, Loveland, Larimer Co. (DRo). One male (52-73-54) 16 Jun 1973, Cherry Creek Village, Arapahoe Co. (JR). One male (52-73-85) 17 Jun 1973, Tarryall Res., Park Co. (DAB). Photo on file.

KENTUCKY WARBLER *(Oporornis formosus).* One female (52-73-29) banded 7 May 1973 along the Arkansas R. 5 mi. E of Pueblo, Pueblo Co. (VT). Photo on file.

HOODED WARBLER *(Wilsonia citrina).* One male (52-73-40) 8 May 1965, Barr Lake, Adams Co. (VR). One male (52-73-96) 12 May 1973, 0.5 mi. S of the Little Thompson R., Berthoud, Larimer Co. (RM). One female (52-73-39) 13 May 1973, Prewitt Res., Washington Co. (JR). One male (52-73-59) 14 May 1973 at the beginning of Cub Lake Trail, Rocky Mountain Natl. Park (BBl).

CANADA WARBLER *(W. canadensis).* One male (52-73-17) 18 Jun 1967, Crow Valley Park, Briggsdale, Weld Co. (HK). One male (52-73-58) 22 Jun 1970, Eldora, Boulder Co. (VR). One male (52-73-112) 26 May 1973, Spring Canyon Dam, 3.5 mi. S and 3 mi. W of Fort Collins, Larimer Co. (RB). Photo on file.

GREAT-TAILED GRACKLE *(Cassidix mexicanus).* One male (54-73-73) 16 Jul 1972, Pastorious Res., Durango, La Plata Co. (EF, RWS).

HEPATIC TANAGER *(Piranga flava).* One pair (55-73-100) 21 July 1973, East Fork of Parachute Creek, Garfield Co. (AGS).

1973 UNACCEPTED RECORDS

RED-THROATED LOON *(Gavia stellata).* One (1-73-86) 4 May-25 Jun 1973, Missouri Heights Res., Garfield Co.

TRUMPETER SWAN *(Olor buccinator).* Five (8-73-83) 17-19 Mar 1971, Lake Estes, Estes Park, Larimer Co.

PIPING PLOVER *(Charadrius melodus).* One (18-73-23) 16 Aug 1971, Lake Cheraw, Otero Co.

RED PHALAROPE *(Phalaropus fulicarius).* One (21-73-109) 31 May 1973, Sawhill Ponds, Boulder Co.

ICELAND GULL *(Larus glaucoides).* One (23-73-19) 31 Mar 1973, Marston Res., Jefferson Co.

LAUGHING GULL *(L. atricilla).* One (23-73-36) 4 Sep 1972, Sheridan Lake, Kiowa Co.

RIVOLI'S HUMMINGBIRD *(Eugenes fulgens).* One pair (31-73-93) 3-22 Aug 1973, La Veta, Huerfano Co.

SHORT-BILLED MARSH WREN *(Cistothorus platensis).* One (42-73-4) 10 Mar 1973, C.F.&I. Lakes, Pueblo, Pueblo Co.

GRAY-CHEEKED THRUSH *(Catharus minimus).* One (44-73-92) 12 May 1973, Bonny Res., Yuma Co. One (44-73-46) 19 May 1973, Bonny Res., Yuma Co.

PHILADELPHIA VIREO *(Vireo philadelphicus).* One (51-73-69) 29 May 1973, Pueblo, Pueblo Co.

LUCY'S WARBLER *(Vermivora luciae).* One (52-73-38) 15 May 1971, Pueblo, Pueblo Co.

KENTUCKY WARBLER *(Oporornis formosus).* One (52-73-114) 13 May 1964 along Van Bibber Creek, Golden, Jefferson Co.

CONNECTICUT WARBLER (O. agilis). Four (52-73-139) 23 Sep 1973, Colorado Springs, El Paso Co.

PAINTED BUNTING *(Passerina ciris).* One (56-73-13) 15 May 1970, Two Buttes Res., Baca Co.

LeCONTE'S SPARROW *(Ammospiza leconteii).* One (56-73-14) 9 May 1967, Cherry Creek Res., Arapahoe Co.

1974 ACCEPTED RECORDS

ARCTIC LOON *(Gavia arctica).* One (1-74-49) 2 Jun 1974, Prospect Res., Weld Co. (JR). One (1-74-140) 27 Oct 1974, Prewitt Res., Washington Co. (RA, JR). One (1-74-155) 3 Nov-1 Dec 1974, Union Res., Weld Co. (RA, PJ, SL). One (1-74-164) 16 Nov 1974, C.F.&I. Lakes, Pueblo, Pueblo Co. (VT). One (1-74-159) 17 Nov 1974, Boyd Lake, Loveland, Larimer Co. (JR). One (1-74-175) 8 Dec 1974, Cherry Creek Res., Arapahoe Co. (JR).

LITTLE BLUE HERON *(Florida caerulea).* One adult (5-74-38) 27 Apr 1974, Fruita, Mesa Co. (DG). One adult (5-74-46) 12 May 1974, Upper Sinton Pond, Colorado Springs, El Paso Co. (BS). One adult (5-74-53) 26 May 1974, Monte Vista NWR, Rio Grande Co. (JRW). One immature (5-74-97) 2 Sep 1974, Prospect Res., Weld Co. (JRo).

RED-SHOULDERED HAWK *(Buteo lineatus).* One immature (10-74-180) 2 Nov 1974-1 Mar 1975, Boulder, Boulder Co. (SL, BrW). This bird was photographed and banded 1 Mar 1975.

COMMON GALLINULE *(Gallinula chloropus).* One (17-74-24) 6 Jun 1965, Muir Springs Park, Morgan Co. (SB, AC).

PIPING PLOVER *(Charadrius melodus).* One (18-74-154) 21 Sep 1974, Dye Res., Rocky Ford, Otero Co. (SL). One (18-74-113) 29 Sep 1974, Jackson Res., Morgan Co. (RA, JR).

AMERICAN WOODCOCK *(Philohela minor).* One (19-74-78) 5 Jul 1974 along the Cache La Poudre R. about 7 mi. NW of Fort Collins, Larimer Co. (PG).

SHORT-BILLED DOWITCHER *(Limnodromus griseus).* One adult (19-74-74) 14 Jul 1974, Timber Lake State Fishing Area, Otero Co. (DAG, JR).

BUFF-BREASTED SANDPIPER *(Tryngites subruficollis).* Two (19-74-71) 6 Sep 1974, Cherry Creek Res., Arapahoe Co. (RA).

HUDSONIAN GODWIT *(Limosa haemastica).* One (19-74-48) 25-26 May 1974, C.F.&I. Lakes, Pueblo, Pueblo Co. (DAG).

LAUGHING GULL *(Larus atricilla).* One adult (23-74-59) 19 May 1974, 1.5 mi. S of Gill, Weld Co. (ND, SL). Two adults (23-74-43) 27 May 1974, Lake Henry, Crowley Co. (DAG, JR).

BLACK-LEGGED KITTIWAKE *(Rissa tridactyla).* Three adults in winter plumage (23-74-144) 29-30 Oct 1974, Coleman Res., Larimer Co. (CC, AM).

LEAST TERN *(Sterna albifrons).* One (23-74-73) 27 Jun-28 Jul 1974, Dye Res., Rocky Ford, Otero Co. (DAG, SO, JR).

BOREAL OWL *(Aegolius funereus).* One adult female (28-74-22) found dead 15 Jun 1973 on the west slope of Rabbit Ears Pass, Routt Co. (GC). Speciman (Colorado State University No. 1310) examined and verified by Dr. R. C. Banks, U. S. Natl. Museum.

ANNA'S HUMMINGBIRD *(Calypte anna).* One male (31-74-18) 21-25 Jun 1970, Durango, La Plata Co. (OR).

BLACK PHOEBE *(Sayornis nigricans).* One pair (34-74-61) 20 Apr through at least 4 Jul 1974 along the St. Charles R. about 20 mi. SW of Pueblo, Pueblo Co. at the same location as in 1972 and 1973 (DAG, VT).

VERMILION FLYCATCHER *(Pyrocephalus rubinus).* One male (34-74-92) 22-31 May 1971, Jefferson, Park Co. (CH). Photo on file.

SHORT-BILLED MARSH WREN *(Cistothorus platensis).* One (42-74-158) 9 Nov 1974, Boulder, Boulder Co. (RA, SL).

PHAINOPEPLA *(Phainopepla nitens).* One (48-74-5) 15 Dec 1973, Boulder, Boulder Co. (ABC) (Hubbard et al., Western Birds 6:28, 1975). Photo on file.

WHITE-EYED VIREO *(Vireo griseus).* One (51-74-103) 21 Sep 1974, Waterton, Jefferson Co. (RA).

PHILADELPHIA VIREO *(V. philadelphicus).* One (51-74-30) 4 Sep 1973, Longmont, Boulder Co. (AC).

PROTHONOTARY WARBLER *(Protonotaria citrea).* One male (52-74-61) 11-12 May 1974, Bonny Res., Yuma Co. (SL, RS). One male (52-74-34) 12-29 May 1974, Claymore Lake, Larimer Co. (PG).

GOLDEN-WINGED WARBLER *(Vermivora chrysoptera).* One male (52-74-50) 12 May 1974, Cottonwood Canyon, Baca Co. (HK). One male (52-74-67) 27 May 1974, Marshdale, Jefferson Co. (DS). One female (52-74-70) 4 Jul 1974, Rocky Mountain Natl. Park (RM, VT). One (52-74-132) 28 Sep 1974, Boulder, Boulder Co. (DBB, ND, SL).

BLUE-WINGED WARBLER *(V. pinus).* One adult (52-74-83) 19 Jun 1970, Fort Collins, Larimer Co. (CSR). One adult (52-74-84) 24 Apr 1971. Bonny Res., Yuma Co. (JW).

CAPE MAY WARBLER *(Dendroica tigrina).* One (52-74-166) 20-23 Nov 1974, Waterton, Jefferson Co. (HK, MOS).

BLACKBURNIAN WARBLER *(D. fusca).* One male (52-74-51) 30 Apr 1974, Boulder, Boulder Co. (BHC). One female (52-74-63) 8 May 1974, Boulder, Boulder Co. (ND, SL). One male (52-74-85) 18 May 1974, Bonny Res., Yuma Co. (DS). One (52-74-153) 20 Oct 1974, Boulder, Boulder Co. (SL). One (52-74-152) 29 Oct 1974, Boulder, Boulder Co. (DBB, CCo).

YELLOW-THROATED WARBLER *(D. dominica).* One adult (52-74-32) 30 Apr-1 May 1974, Waterton, Jefferson Co. (JR).

BAY-BREASTED WARBLER *(D. castanea).* One male (52-74-69) 17 May 1974, Pueblo Res., Pueblo Co. (VT). One male (52-74-64) 19 May 1974, Briggsdale, Weld Co. (ND, SL). Photo on file. One female (52-74-65) 22 May 1974, Boulder, Boulder Co. (ND, SL). One male (52-74-183) 23 May 1974, Pueblo, Pueblo Co. (CES). One male (52-74-143) 15 Jun 1974, Evergreen, Jefferson Co. (WB). One (52-74-157) 28-29 Sep 1974, Lakewood, Jefferson Co. (JRC). One (52-74-139) 27 Oct 1974, Prewitt Res., Washington Co. (RA). One (52-74-145) 2 Nov 1974, Boulder, Boulder Co. (SL, JR). One (52-74-182) 9-12 Nov 1974, Boulder, Boulder Co. (SL).

PINE WARBLER *(D. pinus).* One (52-74-76) 11 May 1974, Claymore Lake, Larimer Co. (PG).

KENTUCKY WARBLER *(Oporornis formosus).* One male (52-74-33) 9 May 1974, Avondale, Pueblo Co. (DAG).

HOODED WARBLER *(Wilsonia citrina).* One male (52-74-47) 27 Apr 1974, Fort Morgan, Morgan Co. (JCR). One male (52-74-45) 3 May 1974, Pueblo, Pueblo Co. (DAS). One female (52-74-42) 27 May 1974, Lake Henry, Crowley Co. (JR). One female (52-74-75) 1 Jun 1974, Jefferson, Park Co. (CH). One male (52-74-134) 13 Sep 1974, Pueblo, Pueblo Co. (CAG).

CANADA WARBLER *(W. canadensis).* One male (52-74-37) 12 May 1974, Fountain Valley School, Security, El Paso Co. (DL). One male (52-74-111) 28 Sep 1974, Waterton, Jefferson Co. (BrW).

PAINTED REDSTART *(Setophaga picta).* One adult (52-74-177) 16 May 1965, Golden, Jefferson Co. (GS). One adult (52-74-179) 26-31 May 1967, Powell Mesa near Hotchkiss, Delta Co. (TC). One adult (52-74-160) 16-18 Nov 1974, 5 mi. W of Loveland, Larimer Co. (RA, AC, CC, LM, JR).

GREAT-TAILED GRACKLE *(Cassidix mexicanus).* One male (54-74-7) during the winter of 1973-1974 through early May 1974, Gunnison, Gunnison Co. (ASH). One female (54-74-115) banded 17 Sep 1974, Pueblo, Pueblo Co. (VT).

PAINTED BUNTING *(Passerina ciris).* One female (56-74-36) 10 May 1974, Two Buttes Res., Baca Co. (PJ, HK, DS).

PURPLE FINCH *(Carpodacus purpureus).* One female (56-74-20) 9-18 Jan 1974, Pueblo, Pueblo Co. (VT). Photo on file. One female (56-74-174) 15 Nov 1974 through early spring 1975, Boulder, Boulder Co. (ABC).

SHARP-TAILED SPARROW *(Ammospiza caudacuta).* One (56-73-146) 22 Dec 1973, C.F.&I. Lakes, Pueblo, Pueblo Co. (DM, VT).

GOLDEN-CROWNED SPARROW *(Zonotrichia atricapilla).* One (56-74-189) banded 8 Apr 1965, 2 mi. N of Livermore, Larimer Co. (GB). Photo on file. One adult (56-74-128) 10 Oct 1974, West Animas Valley, 8 mi. N of Durango, La Plata Co. (GJC).

SNOW BUNTING *(Plectrophenax nivalis).* One (56-74-2) 3-7 Jan 1974, 7 mi. N of Waterton, Jefferson Co. (DAM).

1974 UNACCEPTED RECORDS

SWALLOW-TAILED KITE *(Elanoides forficatus).* One (10-74-17) 12 Jan 1974, Fairplay, Park Co.

HUDSONIAN GODWIT *(Limosa haemastica).* One (19-74-71) 12 Jun 1969, Pawnee Natl. Grassland, Weld Co.

ANNA'S HUMMINGBIRD *(Calypte anna).* One (31-74-118) 27 Sep 1974, Beulah, Pueblo Co.

CAPE MAY WARBLER *(Dendroica tigrina).* One (52-74-93) 18 May 1974, Boulder, Boulder Co.

BAY-BREASTED WARBLER *(D. castanea).* Two (52-74-52) 20 May 1974, Boulder, Boulder Co.

PAINTED REDSTART *(Setophaga picta).* One (52-74-178) 9 May 1969, Lyons, Boulder Co.

EASTERN MEADOWLARK *(Sturnella magna).* One (54-74-86) 6 Jul 1974, Bonny Res., Yuma Co.

GREAT-TAILED GRACKLE *(Cassidix mexicanus).* One (54-74-94) 17 Aug 1974, Rocky Mountain Natl. Park.

1975 ACCEPTED RECORDS

LITTLE BLUE HERON *(Florida caerulea).* One adult (5-75-33) 13-15 Apr 1975, Denver, Denver Co. (RA, JB, HH, TM). Photo on file.

LOUISIANA HERON *(Hydranassa tricolor).* One adult (5-75-121) 13 Jun 1975, North Poudre Res. No. 5, Wellington, Larimer Co. (ATC, MRS). Photo on file.

TRUMPETER SWAN *(Olor buccinator).* One immature male (8-75-160) 1 Dec 1975, Bowles Lake, Jefferson Co. (WG). Apparently the same bird observed and photographed at Main Res., Lakewood, Jefferson Co. 1 or 2 Dec 1975 (HP). Photo on file. This swan was wearing a coded (18TA) yellow neck collar and was banded on 9 Sep 1975 in the Grand Prairie area some 280 mi. NW of Edmonton, Alberta, Canada by Dr. W. D. Stephens, Canadian Wildlife Service.

BLACK SCOTER *(Melanitta nigra).* One immature or female (8-75-146) 26 Oct-30 Nov 1975, Baseline Res., Boulder, Boulder Co. (RA, JR). Two immatures or females (8-75-154) 9-16 Nov 1975, Cherry Creek Res., Arapahoe Co. (RA, JR). One sub-adult male (8-75-161) 15-22 Nov 1975, Cherry Creek Res., Arapahoe Co. (RA). One immature or female (8-75-155) 15-16 Nov 1975, Kendrick Lake, Jefferson Co. (HH). Photo on file.

RUFFED GROUSE *(Bonasa umbellus).* One female with three young (13-75-25) 27 Jul 1947, Hermosa Park, San Juan Natl. Forest, La Plata Co. (OR).

PIPING PLOVER *(Charadrius melodus).* One (18-75-50) 10 May 1975, Red Lion State Wildlife Area, Logan Co. (SL, VR). One (18-75-60) 15-17 May 1975, Union Res., Weld Co. (BHC, SL). Two (18-75-59) 17 May 1975, Cherry Creek Res., Arapahoe Co. (KW). One (18-75-127) 7 Sep 1975, Jumbo Res., Logan Co. (VR). Two (18-75-153), one banded 13 Sep 1975 and one banded 14 Sep 1975, Lake Meredith, Crowley Co. (VT).

HUDSONIAN GODWIT *(Limosa haemastica).* One (19-75-67) 29 May 1975, C.F.&I. Lakes, Pueblo, Pueblo Co. (VT).

RED PHALAROPE *(Phalaropus fulicarius).* One adult female (21-75-64) 1 Jun 1975, Monte Vista NWR, Rio Grande Co. (CB, WJ). One adult male (21-75-149) collected (DMNH No. 36147) 16 Sep 1975, Barr Lake, Adams Co. (RA). One adult (21-75-133) 20 Sep 1975, Barr Lake, Adams Co. (RA, HH, JR). Photo on file.

SHORT-BILLED DOWITCHER *(Limnodromus griseus).* One (19-75-66) 8 Apr 1975, Erie Lakes near Lafayette, Boulder Co. (SL).

POMARINE JAEGER *(Stercorarius pomarinus).* One immature (22-75-147) 5 Oct 1975, Cherry Creek Res., Arapahoe Co. (RA, WL, JR). Photo on file.

PARASITIC JAEGER *(S. parasiticus).* One immature (22-75-116) 15 Aug 1975, Cherry Creek Res., Arapahoe Co. (MOS). One adult (22-75-152) 13 Sep 1975, Lake Meredith, Crowley Co. (VT).

LAUGHING GULL *(Larus atricilla).* Three adults in breeding plumage: one (23-75-41) 5-6 May 1975, Sloan's Lake, Denver, Denver Co. (JRC, VR, BrW); one (23-75-68) 10 May 1975, Holbrook Res., Otero Co. (VT); one (23-75-81) 8 Jun 1975, Jumbo Res., Logan Co. (JLB, ND).

BLACK-LEGGED KITTIWAKE *(Rissa tridactyla).* One immature (23-75-28) 8-18 Mar 1975, Boyd Lake and Horseshoe Lake, Loveland, Larimer Co. (RA, DBB, SL, BrW). Photo on file.

CASPIAN TERN *(Hydroprogne caspia).* One adult (23-75-117) 5 Jul 1975, Fort Collins, Larimer Co. (RB).

WHITE-WINGED DOVE *(Zenaida asiatica).* Two adults (25-75-130) observed 2 Sep 1975 and one collected 6 Sep 1975, 22 mi. due E of Eaton, Weld Co. (RAR, TR). Photo on file.

SPOTTED OWL *(Strix occidentalis).* One adult (28-75-57) 3-5 Jun 1975, Rocky Mountain Arsenal, Adams Co. (RF, HH). Photo on file.

BOREAL OWL *(Aegolius funereus).* One immature (28-75-2) 13 Jul 1974, 5 mi. N of Chambers Lake along the Laramie River Road, Larimer Co. (JLW).

BLACK PHOEBE *(Sayornis nigricans).* One (34-75-43) 20 Apr 1975, C.F.&I. Lakes, Pueblo, Pueblo Co. (VT). Photo on file.

EASTERN WOOD PEWEE *(Contopus virens).* One (34-75-63) 24 May 1975, Julesburg, Sedgwick Co. (WL). One (34-75-124) 17 Jul 1975, Prewitt Res., Washington Co. (WB).

SHORT-BILLED MARSH WREN *(Cistothorus platensis).* Two (42-75-139) 25-30 May 1969, Latham Res., Weld Co. (RA). One (42-75-31) 5 Apr 1975, C.F.&I. Lakes, Pueblo, Pueblo Co. (JL, TM, RSa).

BENDIRE'S THRASHER *(Toxostoma bendirei).* One (43-75-51) 2-3 Aug 1974, 4 mi. SW of Bayfield, La Plata Co. (BM, PMe). Photo on file.

GRAY-CHEEKED THRUSH *(Catharus minimus).* One (44-75-46) 11 May 1975, Bonny Res., Yuma Co. (SL, VR).

WHITE-EYED VIREO *(Vireo griseus).* One (51-75-92) 31 May-1 Jun 1975, East Carrizo Creek, Baca Co. (LW).

PHILADELPHIA VIREO *(V. philadelphicus).* One (51-75-137) 14 Sep 1971, Los Verdes Golf Course, Arapahoe Co. (RA). One (51-75-99) 13 May 1975, Barr Lake, Adams Co. (RA). Two (51-75-158) 17 Oct 1975, Barr Lake, Adams Co. (RA).

PROTHONOTARY WARBLER *(Protonotaria citrea).* One pair (52-75-42) 11 May 1975, Bonny Res., Yuma Co. (HH). Photo on file. One female (52-75-61) 11 May 1975, Jumbo Res., Sedgwick Co. (WL).

SWAINSON'S WARBLER *(Limnothlypis swainsonii).* One adult (52-75-52) 20-21 May 1975, Boulder, Boulder Co. (SL, JR).

GOLDEN-WINGED WARBLER *(Vermivora chrysoptera).* One male (52-75-47) 9 May 1975, Colorado Springs, El Paso Co. (EW). One male (52-75-132) 10 May 1975, Pueblo, Pueblo Co. (JL). One male (52-75-62) 24 May 1975, Julesburg, Sedgwick Co. (WL).

BLUE-WINGED WARBLER *(V. pinus).* One male (52-75-82) 3 May 1975, Boulder, Boulder Co. (DBB, ND, PM). One male (52-75-83) 10 May 1975, Boulder, Boulder Co. (SR).

CAPE MAY WARBLER *(Dendroica tigrina).* One female (52-75-45) 3 May 1975, Two Buttes Res., Baca Co. (SL, VR).

BLACKBURNIAN WARBLER *(D. fusca).* One female (52-75-94) 31 May 1975, Sawhill Ponds, Boulder, Boulder Co. (SL). One pair (52-75-93) 1 Jun 1975, Boulder, Boulder Co. (DBB, SL). One female (52-75-95) 29-31 May 1975, Boulder, Boulder Co. (SL).

YELLOW-THROATED WARBLER *(D. dominica).* One (52-75-32) 12 Apr 1975, Barr Lake, Adams Co. (TM). One (52-75-89) 4 May 1975, Pueblo, Pueblo Co. (DAG).

PINE WARBLER *(D. pinus).* One (52-75-134) 12 Sep 1975, Crow Valley Park, Briggsdale, Weld Co. (VR).

PRAIRIE WARBLER *(D. discolor)* One male (52-75-58) 30-31 May 1975, Boulder, Boulder Co. (BHC, SL). Photo on file. One male (52-75-144) 2-17 Jun 1975, Andrew Orr Ranch, 22 mi. E of Greeley, Weld Co. (AT).

KENTUCKY WARBLER *(Oporornis formosus).* One (52-75-56) banded 6 May 1975, Longmont, Boulder Co. (AC, VW). Photo on file. One (52-75-39) 13 May 1975, Boulder, Boulder Co. (DBB, BHC).

CANADA WARBLER *(Wilsonia canadensis).* One male (52-75-135) 27 Oct 1970, Los Verdes Golf Course, Arapahoe Co. (RA).

EASTERN MEADOWLARK *(Sturnella magna).* Two (54-75-37) 20 Apr 1975, Red Lion State Wildlife Area, Logan Co. (RA, SL). Ten (54-75-44) 10 May 1975, Red Lion State Wildlife Area, Logan Co. (VR).

SCOTT'S ORIOLE *(Icterus parisorum).* One male (54-75-90) 3 May 1975, Waterton, Jefferson Co. (HK, TM, RSa). One male (54-75-91) 5 May 1975, Golden, Jefferson Co. (GS). One male (54-75-101) 15-17 Jun 1975, McCoy, Eagle Co. (ME).

PURPLE FINCH *(Carpodacus purpureus).* One female (56-75-21) 5 Dec 1974-20 Mar 1975, Durango, La Plata Co. (EF). Photo on file. One female (56-75-10) 1 Jan-5 Feb 1975, Pueblo, Pueblo Co. (DAG). One female (56-75-148) 24-25 Oct 1975, Barr Lake, Adams Co. (RA).

GOLDEN-CROWNED SPARROW *(Zonotrichia atricapilla).* One adult (56-75-3) 28 Dec 1974-4 Jan 1975, Waterton, Douglas Co. (JR, RR).

1975 UNACCEPTED RECORDS

RED-SHOULDERED HAWK *(Buteo lineatus).* One (10-75-20) 23 Feb 1975, Pueblo, Pueblo Co. One (10-75-55) 23 Apr 1975, Estes Park, Larimer Co.

GYRFALCON *(Falco rusticollis).* One very dark gray phase (12-75-17) 10 Nov 1974 between Black Hollow Res. and Cobb Lake near Fort Collins, Larimer Co. One light gray phase (12-75-118) 9 Aug 1975, Rocky Mountain Natl. Park.

RED PHALAROPE *(Phalaropus fulicarius).* One (21-75-142) 13 Sep 1975, Chatfield Res., Jefferson Co.

SHORT-BILLED DOWITCHER *(Limnodromus griseus).* One (19-75-105) 13 May 1975, Barr Lake, Adams Co. One adult (19-75-129) 6 Sep 1975, Lake Meredith, Crowley Co.

PARASITIC JAEGER *(Stercorarius parasiticus).* One dark phase (22-75-143) 28 Sep 1975, Dye Res., Rocky Ford, Otero Co.

LAUGHING GULL *(Larus atricilla).* One (23-75-78) 10 May 1975, C.F.&I. Lakes, Pueblo, Pueblo Co.

LITTLE GULL *(L. minutus).* One (23-75-128) 6 Sep 1975, Lake Meredith, Crowley Co.

SPOTTED OWL *(Strix occidentalis).* One (28-75-115) 29 Jul 1975, 5 mi. SW of Beulah, Pueblo Co.

BLUE-THROATED HUMMINGBIRD *(Lampornis clemenciae).* One (31-75-88) 19 Jun, 4 and 6 Jul 1975, Lake Isabel, Custer Co.

EASTERN WOOD PEWEE *(Contopus virens).* One (34-75-96) 24 May 1975, Waterton, Jefferson Co.

SHORT-BILLED MARSH WREN *(Cistothorus platensis).* One (42-75-87) mid November 1974, Fruita, Mesa Co.

SPRAGUE'S PIPIT *(Anthus spragueii).* One (46-75-138) 1 Sep 1969, SE Denver, Denver Co.

PHAINOPEPLA *(Phainopepla nitens).* One (48-75-8), Nov 1974, Pueblo, Pueblo Co.

PHILADELPHIA VIREO *(Vireo philadelphicus).* One (51-75-23) 27 Jul 1947, Hermosa Park, San Juan Natl. Forest, La Plata Co. One (51-75-27) 10 Jul 1969, Durango, La Plata Co.

BLACKBURNIAN WARBLER *(Dendroica fusca).* One (52-75-156) 1 Jun 1975, Lakewood, Jefferson Co.

PINE WARBLER *(D. pinus).* One (52-75-1) 23 Nov 1974, Boulder, Boulder Co.

KENTUCKY WARBLER *(Oporornis formosus).* One (52-75-85) 12 May 1975, Durango, La Plata Co.

PAINTED REDSTART *(Setophaga picta).* One (52-75-86) 10 May 1975, Tveten Ranch near Berthoud, Larimer Co.

SCOTT'S ORIOLE *(Icterus parisorum).* One pair (54-75-111) 4 Jun 1966, Montezuma Co.

PURPLE FINCH *(Carpodacus purpureus).* One (56-75-5) 31 Dec 1974, Boulder, Boulder Co. One female (56-75-11) 21 Jan 1975, Boulder, Boulder Co. One female (56-75-65) 31 Mar 1975, Boulder, Boulder Co.

SMITH'S LONGSPUR *(Calcarius pictus).* One (56-75-140) 3 Aug 1974 at an elevation of 13,400' near Creede, Mineral Co.

CONTRIBUTORS

Robert Andrews (RA), Dominic A. Bartol, Jr. (DAB), George Bear (GB), Johanna Billmeyer (JB), Ben Blazier (BBl), David Bolton (DBo), D. Bruce Bosley (DBB), Roger L. Boyd (RB), Donna M. Bregenzer (DBr), Sylvia Booth Brockner (SB), Winston W. Brockner (WB), Charles R. Bryant (CB), John L. Butler (JLB), Urling Cannon (UCa), E. P. Carter, Jr. (EPC), Honeywood P. Carter (HPC), Dr. Ward Chadwick (WC), Gloria J. Childress (GJC), Bayard H. Cobb (BHC), Theodora S. Colborn (TC), Allegra Collister (AC), John R. Cooper (JRC), Jerry F. Copeland (JFC), Cathy Cowles (CCo), Gerald R. Craig (GC), Dr. Alexander T. Cringan (ATC), Allen B. Crockett (ABC), Camille Cummings (CC), Narca DeWoskin (ND), Lucy Ela (LE), Margaret Ewing (ME), Randall L. Fairbanks (RF), Elva Fox (EF), David Galinat (DG), Paul Gertler (PG), Walter D. Graul (WG), Claire A. Griffiths (CAG), Dave A. Griffiths (DAG), Carol Hack (CH), Harold R. Holt (HH), Dr. A. Sidney Hyde (ASH), William F. Johnson (WJ), Paul R. Julian (PJ), Hugh E. Kingery (HK), David Laliberte (DL), James A. Lane (JAL), Steve Larson (SL), Philip N. Lehner (PNL), Jerry C. Ligon (JL), William A. Lybarger (WL), Dr. Thompson G. Marsh (TM), Lois Mathews (LM), D. Arch McCallum (DAM), Dave McCargo (DM), Ann Means (AM), Berniece Merry (BM), Paul Merry (PMe), Michael Moulton (MM), Peter J. Moulton (PM), Rusty Muller (RM), Bernice Noyce (BNo), Ray Olson (RO), Stanley W. Oswald (SO), Henry G. Pelon (HP), Don Radovich (DRa), Thomas D. Ray (TR), Oppie Reames (OR), Jack Reddall (JR), Robert Reed (RR), Chandler S. Robbins (CSR), Doris Robertson (DRo), Scott L. Roederer (SR), Joe Roller (JRo), Dr. Ronald A. Ryder (RAR), Ralph Sargent (RSa), Michael Schultz (MSc), George R. Shier (GS), David A. Silverman (DAS), Carolyn E. Simpson (CES), Allen G. Smith (AGS), Mildred O. Snyder (MOS), Ben Sorenson (BS), Robert A. Spencer (RS), P. H. R. Stepney (PHRS), Karen Steenhoff (KSt), Douglas Stotz (DS), Richard W. Stransky (RWS), Dr. Gustav Swanson (GSw), Michael R. Szymczak (MRS), Van A. Truan (VT), Allen A. Tubbs (AT), John L. Wagner (JLW), Vern Walker (VW), Bruce Webb (BrW), Lois E. Webster (LW), Jack Welch (JW), James R. Wheeling (JRW), Kathryn Whipple (KW), Elinor Wills (EW).

RARE AND UNUSUAL SPECIES

The CFO Official Records Committee requests that detailed documentation be submitted for the following rare and unusual species which have been recorded 15 times or less from within Colorado prior to 1 Jan 1976:

Red-throated Loon
Red-necked Grebe
Brown Pelican
Olivaceous Cormorant
Anhinga
Little Blue Heron
Reddish Egret
Louisiana Heron
Wood Stork
Glossy Ibis
Roseate Spoonbill
Trumpeter Swan
Brant
Black Brant
European Wigeon
Harlequin Duck
Common Eider
Black Scoter
Swallow-tailed Kite
Red-shouldered Hawk
Gyrfalcon
Ruffed Grouse
Whooping Crane
Yellow Rail
Common Gallinule
Hudsonian Godwit
Eskimo Curlew
Red Phalarope
American Woodcock
Short-billed Dowitcher
Buff-breasted Sandpiper
Pomarine Jaeger
Parasitic Jaeger
Long-tailed Jaeger
Iceland Gull
Laughing Gull
Little Gull
Ivory Gull
Black-legged Kittiwake
Least Tern
Caspian Tern
Ancient Murrelet
White-winged Dove
Barred Owl
Spotted Owl
Boreal Owl
Whip-poor-will
Lesser Nighthawk
Anna's Hummingbird
Rivoli's Hummingbird
Blue-throated Hummingbird
Olivaceous Flycatcher
Black Phoebe
Eastern Wood Pewee
Purple Martin (eastern slope only)
Short-billed Marsh Wren
Long-billed Thrasher
Bendire's Thrasher
Gray-cheeked Thrush
Sprague's Pipit
Phainopepla
White-eyed Vireo
Yellow-throated Vireo
Philadelphia Vireo
Prothonotary Warbler
Swainson's Warbler
Blue-winged Warbler
Lucy's Warbler
Cape May Warbler
Hermit Warbler
Cerulean Warbler
Yellow-throated Warbler
Pine Warbler
Prairie Warbler
Louisiana Waterthrush
Kentucky Warbler
Connecticut Warbler
Canada Warbler
Painted Redstart
Eastern Meadowlark
Great-tailed Grackle
Hepatic Tanager
Painted Bunting
Purple Finch
LeConte's Saprrow
Sharp-tailed Sparrow
Golden-crowned Sparrow
Smith's Longspur

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The Records Committee expresses its appreciation to those Colorado field observers as well as others from outside our state for their continued interest and cooperation.

Saw-whet Owl on Bristlecone Pine

Detail from an etching by Dennis Beall

BIRD MORTALITY AT A GLASSED-IN WALKWAY IN WASHINGTON STATE

RICHARD E. JOHNSON and GEORGE E. HUDSON, Department of Zoology and Charles R. Conner Museum, Washington State University, Pullman, Washington 99163

Many studies have dealt with the spectacular bird losses during migration that occur in the eastern United States at airport ceilometers (Spofford 1949, Howell et al. 1954, Johnston 1955, Johnston and Haines 1957), TV towers (Tordoff and Mengel 1956, Brewer and Ellis 1958, Kemper 1958, 1964, Kemper et al. 1966, Stoddard and Norris 1967, Graber 1968, Taylor and Anderson 1973) and tall buildings (Overing 1936, 1937, 1938a, 1938b, Pough 1948). From these have come an increased knowledge of the biology of migratory species and, in certain cases, suggestions leading to a decrease in the number of birds killed (Tordoff and Mengel 1956, Cahalane 1966).

Less consideration has been given to the mortality associated with lower structures whose individual impacts are small but when taken together may equal the destruction from the sources mentioned above. Perhaps most important are structures with large windows, particularly if sky and vegetation can be seen clearly on the opposite side.

The present paper examines mortality associated with a glassed-in walkway on the campus of Washington State University in Pullman, Washington, between 20 May 1968 and 30 June 1974. A partial deterrent to mortality in the form of silhouettes of raptorial birds placed on the windows beginning 15 March 1970 also is discussed.

THE WALKWAY AND SURROUNDING AREA

The city of Pullman is built on hilly topography in the Palouse wheat country of southeastern Washington. The city and campus provide an island of trees within this largely open area.

The walkway is a structure 21.8 m long, 15.3 m high and 3.8 m wide connecting Science and Heald Halls at four levels. Windows enclose the three upper floors but leave a breezeway 3.3 m high at the ground level. Thus, the total area of one side of the structure is about 261 m^2. Of this, 139 m^2 is glass, the remainder being concrete and steel. Interior incandescent lights are spaced along each level but are probably of little consequence to the birds because the lights are usually turned off at all hours and burn only dimly when on.

The walkway and buildings are on a southwest facing slope. The walkway runs approximately east to west with the ground in the immediate vicinity sloping gently to the south. However, about 30 meters to the south the slope drops away sharply and at a similar distance to the north the slope turns up. A portion of the area on either side of

the walkway is planted with trees and shrubs. A bird approaching from the south would see trees and sky through the glass and one from the north would see open sky.

COMPOSITION OF KILL

Over the 73 months of the study 266 birds of 41 species and 15 families were recorded (Table 1). The most common species were Pine Siskin (19.9%), Dark-eyed Junco (7.1%), American Robin (4.9%) and House Sparrow (4.9%). Families most heavily represented were Fringillidae (48.9%), Parulidae (22.6%) and Turdidae (8.3%). Of the latter family only three (1.1% of the total kill) were thrushes of the genus *Catharus*.

These results differ markedly from those obtained in the eastern United States where mortality occurred at ceilometers, TV towers and tall buildings (Table 2). In those studies warblers, and often vireos and catharid thrushes, made up the largest portion of the kill and finches were sparsely represented. Several factors probably contribute to these differences.

One is the distribution of the kills over the 24-hour day. The glassed-in walkway is invisible to birds during both day and night and, thus, resulted in mortality at all hours. Partly for this reason, nocturnal migrants (ex. warblers, vireos, catharid thrushes) form a smaller fraction of the kill and diurnal migrants such as robins, waxwings and cardueline finches contribute a larger portion than in previous studies. The latter taxa made up 4.9%, 3.8% and 32.7%, respectively, of the total kill at the walkway in contrast to earlier studies where their combined presence was in each case less than one percent.

This shift away from an exclusively nocturnal kill is probably accentuated by the effective height of the walkway compared to that of the other agents. Most earlier reports considered structures and lights that reach 500 feet or more into the air and well above surrounding buildings. The walkway, by contrast, is much lower and does not project above the buildings in the vicinity. Because nocturnal migrants generally fly high (Bellrose 1971), the mortality to these species is doubtless reduced. A similar reduction would not be expected for diurnal species because their activities center closer to the ground.

Another factor affecting the relative abundance of the species obtained is the seasonal timing and duration of the studies. Most previous work was limited to the early portion of the fall migratory period or even to a single large kill on one night of that period (Table 2). As pointed out by Stoddard and Norris (1967), finches tend to migrate late and, therefore, probably were underrepresented in these studies. Their own data based upon daily sampling throughout the year at a Florida TV tower give a higher percentage of finches than in all but

Table 1. Mortality at the glassed-in walkway before and after installation of silhouettes of raptorial birds.

SPECIES	20 MAY 1968-15 MARCH 1970		16 MARCH 1970-30 JUNE 1974	
	No. killed	No./year	No. killed	No./year
Mourning Dove	6	3.0	0	0.0
Belted Kingfisher	1	0.5	0	0.0
Common Flicker	0	0.0	1	0.2
Hammond's Flycatcher	1	0.5	0	0.0
Red-breasted Nuthatch	5	2.5	2	0.5
Brown Creeper	0	0.0	1	0.2
House Wren	0	0.0	1	0.2
American Robin	9	4.5	4	1.0
Varied Thrush	1	0.5	4	1.0
Hermit Thrush	0	0.0	1	0.2
Swainson's Thrush	1	0.5	1	0.2
Townsend's Solitaire	1	0.5	0	0.0
Golden-crowned Kinglet	0	0.0	1	0.2
Ruby-crowned Kinglet	1	0.5	0	0.0
Bohemian Waxwing	8	4.0	0	0.0
Cedar Waxwing	1	0.5	1	0.2
Warbling Vireo	0	0.0	2	0.5
Black-and-white Warbler	0	0.0	1	0.2
Orange-crowned Warbler	8	4.0	3	0.8
Nashville Warbler	5	2.5	1	0.2
Yellow Warbler	9	4.5	1	0.2
Yellow-rumped Warbler	3	1.5	3	0.8
Townsend's Warbler	2	1.0	2	0.5
MacGillivray's Warbler	8	4.0	4	1.0
Wilson's Warbler	7	3.5	3	0.8
House Sparrow	8	4.0	5	1.3
Western Tanager	5	2.5	4	1.0
Black-headed Grosbeak	1	0.5	1	0.2
Lazuli Bunting	4	2.0	2	0.5
Evening Grosbeak	6	3.0	2	0.5
Cassin's Finch	1	0.5	0	0.0
House Finch	9	4.5	3	0.8
Pine Siskin	28	14.0	25	6.6
American Goldfinch	0	0.0	4	1.0
Red Crossbill	1	0.5	7	1.8
White-winged Crossbill	1	0.5	0	0.0
Dark-eyed Junco	7	3.5	12	3.0
Chipping Sparrow	3	1.5	1	0.2
White-crowned Sparrow	4	2.0	6	1.5
Fox Sparrow	0	0.0	1	0.2
Lincoln's Sparrow	0	0.0	1	0.2
TOTALS	155	77.5	111	27.7

Table 2. Frequency of occurrence (%) of four avian families in kills. The percent catharid thrushes is given in parentheses where this figure differs from that for the entire family.

Location	Reference	Turdidae	Vireonidae	Parulidae	Fringillidae	Date	Cause of Mortality
Minnesota	1	31.2	10.6	30.1	1.1	10 Sep	TV tower
Wisconsin	1	6.2	32.9	52.0	1.4	10 Sep	TV tower
New York	2	1.0	7.8	86.4	1.0	10 Sep	Tall bldg.
District of Columbia	3	0.1	32.1	61.0	1.5	Aug-Nov	Tall bldg.
Kansas	4	1.8	14.9	53.8	17.4	Sep-Oct	TV tower
Illinois	5	4.9	6.6	69.5	7.8	Fall and spring	TV tower
Illinois	6	25.6	9.7	44.3	6.3	Sep	TV tower
Tennessee	2	1.6	38.7	44.8	0.4	10 Sep	Ceilometer
Georgia	7	14.4	15.4	54.1	7.1	8 Oct	Ceilometer
Florida	8	5.3(5.0)	23.2	43.6	11.6	Jan-Dec	TV tower
Florida	9	0.6	2.7	84.5	1.4	Aug-Dec	TV tower
Washington	10	8.3(1.1)	0.8	22.6	48.9	Jan-Dec	Glassed-in walkway

References cited above:

1. Kemper et al. (1966)
2. Spofford (1949)
3. Overing (1936, 1937, 1938b)
4. Tordoff and Mengel (1956)
5. Brewer and Ellis (1958)
6. Graber (1968)
7. Johnston (1955), Johnston and Haines (1957)
8. Stoddard and Norris (1967)
9. Taylor and Anderson (1973)
10. This study

one previous study. The large proportion of finches obtained in our work is partly a result of inclusion of these late migrants.

Finally, it seems likely that our results reflect, in part, regional differences in occurrence of the various species. For example, warblers and vireos have a lower abundance and diversity in the West than in the East (Chapman 1917, Robbins and Van Velzen 1969) and finches seem to be the reverse with cardueline finches being especially low in the Southeast (Robbins et al. 1966).

SEASONAL VARIATION OF KILL

Examination of the seasonal distribution of the kill (Figure 1) shows that most of the mortality occurred during the annual migratory periods and especially during fall migration. Species largely confined to these periods include most of the warblers and the White-crowned Sparrow. Certain species, however, were associated with other seasons. For example, Bohemian Waxwings, Evening Grosbeaks and Red Crossbills were killed primarily in winter when they sometimes occurred in large flocks in the region. Still others, such as the Lazuli Bunting, House Finch and

Chipping Sparrow, were obtained principally in the summer and may have been drawn from local breeding populations. Mortality at the walkway during summer and winter appears to make up a larger fraction of the total kill than is found during similar periods at TV towers, tall buildings and ceilometers. This is suggested by comparison with data from several studies but especially with those from the Florida TV tower studied extensively by Stoddard and Norris (1967). Mortality at the tower fell below three percent of the total annual kill during each of three summer (May, June, July) and three winter (December, January, February) months, although large numbers of birds probably occurred in the area at both of these seasons. In contrast, mortality at the walkway dropped to this level during only two months and these were both in winter (January, February) when few birds remain in Pullman. The apparent explanation for this difference is, as noted earli-

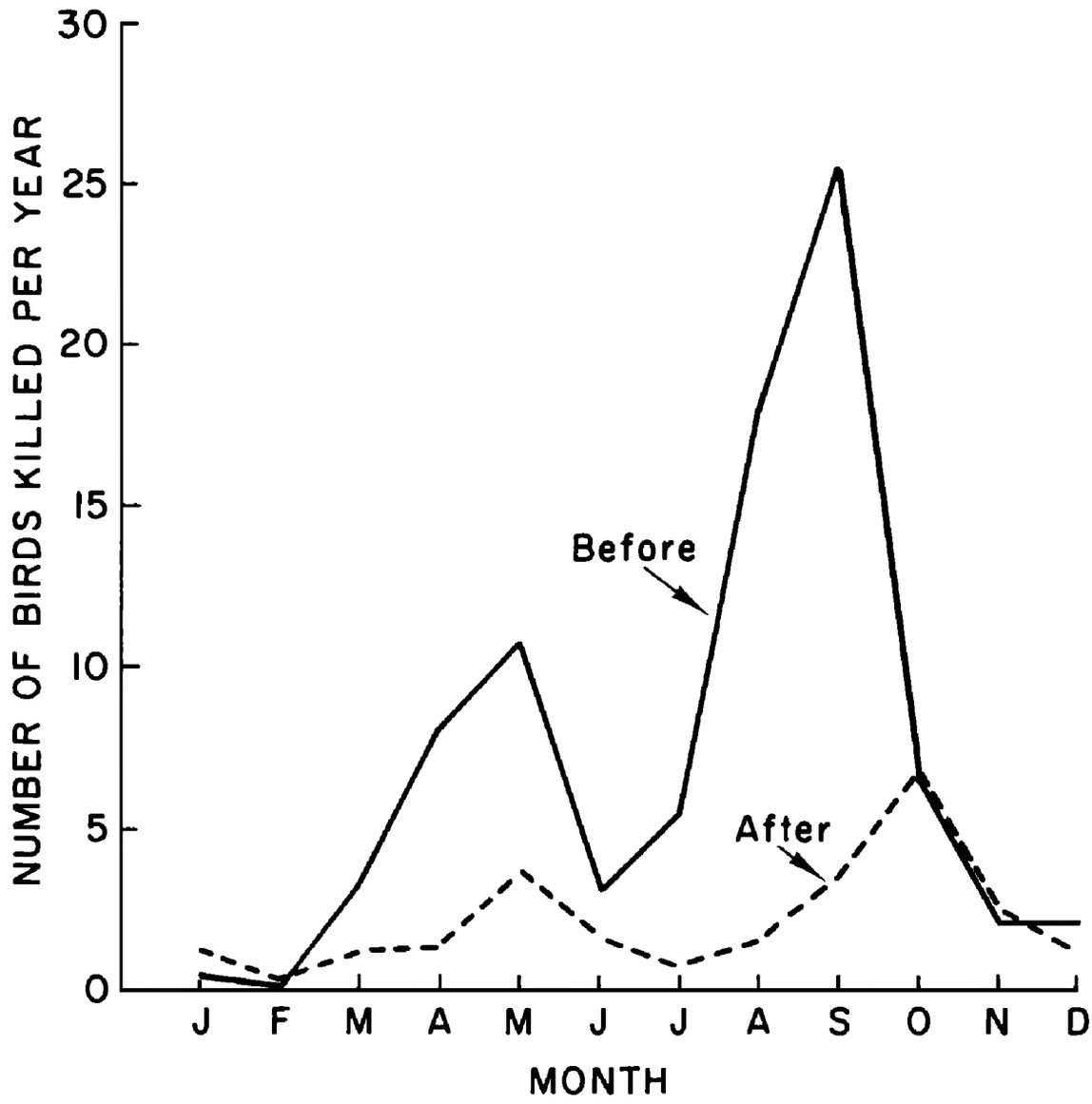

Figure 1. Seasonal variation in mortality at the glassed-in walkway before and after installation of silhouettes of raptorial birds.

er, that birds are killed at the walkway at all hours and thus at all seasons, whereas the other agents cause mortality only at night and thus almost exclusively during migration.

THE SILHOUETTES

On 15 March 1970, about two years after the first birds were collected, lifesize silhouettes of raptorial birds sitting in profile or flying were placed on windows on each level of the walkway. Initially twelve silhouettes were located on each side of the structure but in the four years that followed some were lost and at the end only half the original number remained.

Mortality before and after installation of the silhouettes is given for each species in Table 1 and for each month in Figure 1. The numbers of birds killed per year before and after installation (Table 1) were approximated by dividing the total kill for each period by the nearest whole number of years. The errors introduced by this method are small and biased in the direction of reduced annual mortality in the former period and increased mortality in the latter. Subsequent to placement of the silhouettes total mortality decreased to approximately one-third the former rate. Nearly three-fourths of the species shared in this reduction and every species with a mortality rate of one or more per year in the former period showed a decline after the silhouettes were in place. Only three species, Varied Thrush, American Goldfinch and Red Crossbill, experienced an increase to one or more killed per year. There is little question, then, that the silhouettes were effective deterrents to mortality, but it is uncertain whether the raptorial shape of these figures was important or if the same results would have been obtained using any object of similar size regardless of shape.

Variation in the number of silhouettes during the latter part of the study apparently had little effect upon mortality. From 1970 through 1973, when the number of silhouettes was declining, the annual mortality rate remained nearly constant at 29, 22, 28, and 25 for the respective years.

Figure 1 shows an apparent shift in the peak of fall migration after the silhouettes were installed. It seems likely that most of this difference was due to chance and to annual differences in migration and not to any intrinsic effect of the silhouettes. Pine Siskins, for example, occur in the area in large numbers only sporadically and not in every year, yet they make up over 30% of the total fall (August through October) kill. The chance occurrence of siskin flocks greatly influenced the position of the peaks of migration shown in Figure 1 and omission of data for this species moves the peaks much closer together.

However, some of the difference in timing of migratory peaks may be related to the direct effect of the silhouettes. Warblers, which make

up 32% of the total fall kill, showed an 80% decline in mortality rate after placement of the silhouettes, whereas the overall decrease is only about 64% and the decrease for fringillids is only 51%. Such differences in decline of mortality rates suggest differing sensitivities of the various taxa to the silhouettes between night and day. The disproportionate decline in numbers of warblers killed contributes to the observed shift toward a later peak of migration because warblers migrate earlier than most other species.

SPECIES ACCOUNTS

Several birds obtained at the walkway represent new early or late dates for migration in southeastern Washington and one is the first record at any season for the region. These records are summarized below. Asterisks mark records documented by specimens in Conner Museum.

Southeastern Washington is defined as the entire southeastern corner of the state, an area of about 41,000 km^2, bordered on the north by the Spokane and Columbia rivers, on the west by the Columbia River, on the south by Oregon and on the east by Idaho. This is the same area treated earlier by Hudson and Yocom (1954) and references below to previous records for the region are from this source except when noted.

Hammond's Flycatcher *(Empidonax hammondii).* A female obtained on 16 May 1969 is the earliest known spring record for the region.

Black-and-white Warbler *(Mniotilta varia).* One male obtained on 30 May 1973* (Conner Museum No. 73-215). There are only two previous records for the region (Hudson and Yocom 1954, Biddulph 1967).

Nashville Warbler *(Vermivora ruficapilla).* Heretofore known only as an uncommon spring migrant. Five fall records obtained as follows: 2* and 9* September 1968, 14* and 29 August 1969, 6* September 1971.

Yellow Warbler *(Dendroica petechia).* One on 27 August 1969 is the latest fall record for the region.

Townsend's Warbler *(D. townsendi).* One on 23 September 1968 is the latest fall record for the region.

Macgillivray's Warbler *(Oporornis tolmiei).* Three birds were later than existing fall records: 23* and 24* September 1968 and 28 September 1970.

Wilson's Warbler *(Wilsonia pusilla).* All fall records have previously been from 3 to 15 September. Five birds were obtained on earlier dates: 19 and 20 August 1968; 8, 10* and 25 August 1969.

White-winged Crossbill *(Loxia leucoptera).* A male obtained on 2 January 1970* is the first record for the region (Conner Museum No. 70-29).

Lincoln's Sparrow *(Melospiza lincolnii).* One on 25 May 1970 is only the second spring record for the region.

SUMMARY

Mortality at a glassed-in walkway between two buildings on the campus of Washington State University in Pullman, Washington, was studied

from 20 May 1968 to 30 June 1974. The kill consisted of 266 individuals of 41 species and 15 families. Fringillids were heavily represented (48.9% of kill) and warblers contributed a smaller fraction (22.6%). These results differ from those obtained from kills at ceilometers, TV towers and tall buildings in the eastern United States where warblers usually contribute a larger fraction and finches a much smaller portion. These differences are probably a result of increased diurnal and decreased nocturnal sampling by the walkway. The timing of the study and regional differences in family abundance also may have played a role.

Greatest mortality occurred during the fall and spring migratory periods but significant numbers were killed at other times as well. New early and late dates for migration of several species were obtained. A White-winged Crossbill specimen provided a new species record for southeastern Washington.

Silhouettes of raptorial birds placed on the windows on 15 March 1970 resulted in a decrease in mortality to one-third the previous rate.

ACKNOWLEDGMENTS

We are indebted to the many students and faculty who aided in gathering the specimens and to Mrs. Hudson and several faculty and student wives who made the silhouettes. Mrs. Hudson originally suggested using silhouettes. Barbara A. Barr read the manuscript and made helpful suggestions.

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Sketch by Tim Manolis

NOTES

NORTHERN GOSHAWK NESTING DENSITIES IN MONTANE COLORADO

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The Northern Goshawk *(Accipiter gentilis)* is a rarely seen bird of prey found throughout the mountain regions of Colorado. Because of its reticent manner, very little has been written on Northern Goshawk population densities in Colorado or any other part of the United States. Recently, a five year study was completed in Alaska which showed a nesting density ranging from one nest per 46 km^2 to one nest per 373 km^2 (McGowan 1975). Although this nesting density is lower than those found in similar studies in Finland which showed densities of one nest per 22-100 km^2 (Hogland 1964) and one nest per 16.4 km^2 (Hakala 1969), no other study has been reported in the United States. In Colorado, very few active nests have been reported, and as a result, state and federal agencies have described the Northern Goshawk as rare or occasional.

The area under study (Figure 1) is an 81 km^2 segment of a river valley in the Rocky Mountains of northern Colorado. This river valley, at an elevation of 2460 to 2550 m, contains extensive stands of Lodgepole Pine *(Pinus contorta)* interspersed with Quaking Aspen *(Populus tremuloides)*. Along the river bottom are open sage *(Artemisia)* flats with willow *(Salix)* thickets bordering the river's edge. The valley shows a history of glaciation, being "U" shaped with the valley walls reaching approximately 300 m in height at an average 25% slope before abruptly flattening out. The valley is approximately 9 km wide at the study area; the top of the walls are the study boundary. The length of the study area is 11 km.

Ranches are present along the river bottom, and cattle are grazed throughout most of the study area. Near the main roads, small logging operations have opened up parts of the usually dense lodgepole pine stands.

All nests were found by traversing the study area on foot. An attempt was made to cover all terrain in the study area, whether or not the area seemed suitable for nesting goshawks. Signs looked for included plucking perches, kills, whitewash, and pellets. The goshawks' noisy defense of the nest sites was also helpful in locating the nests. The nests, once located, were then checked to see if they were active that year.

The goshawks' ability to successfully nest near man became quite apparent, as all nests were within 2 km of main roads. Several nests were within 0.5 km of ranches in the valley, yet after interviewing the ranchers, I found very few people had ever seen the hawks. Later observations showed that the goshawks were hunting in and around the ranches.

During the summers of 1974 and 1975, nine active nests were found in the study area. Using the locations of the active nests for each year, nesting densities for the two years were obtained. The area may have had more nests than were located; due to the difficulty in finding nests, the densities should be considered as minimum for the area.

In 1974, six active nests were found in the study area, for a nesting density of one nest per 13.3 km^2. The closest two nests were 2.4 km apart, indicating a higher density may be possible under certain conditions. Two of these nest sites had old nests nearby, indicating goshawks had nested in the same area in previous years..

In 1975, there were also six active nests in the area, though four nests active in 1974 were abandoned. Two of these four abandoned nests had new nests built

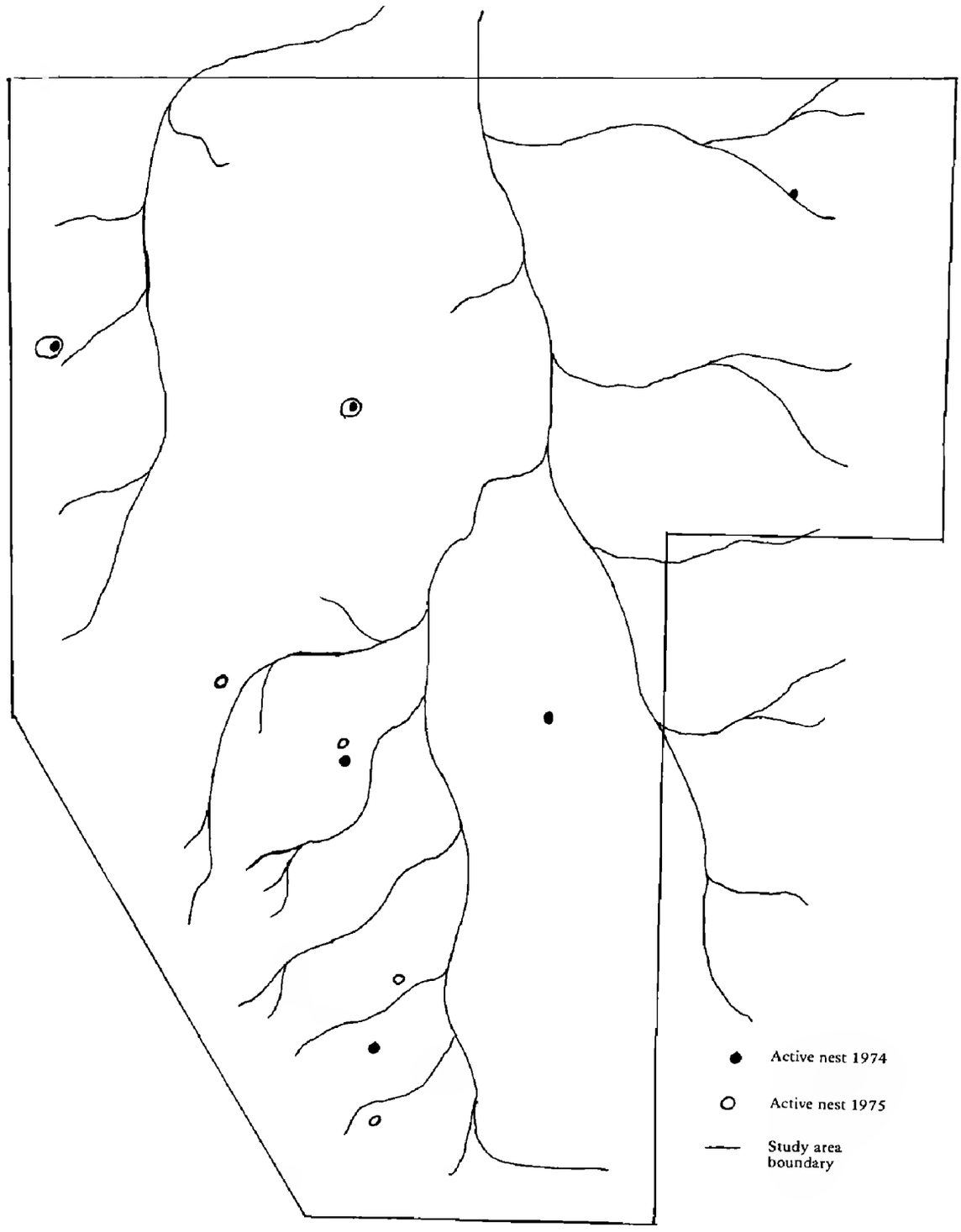

Figure 1. Northern Goshawk (*Accipiter gentilis*) nesting area in northern Colorado. Study area is approximately 9 x 11 km.

a short distance away. The closest two nests in 1975 were 0.8 km apart, which is closer than any recorded in the literature I reviewed.

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EVIDENCE FROM SEABIRDS OF PLASTIC PARTICLE POLLUTION OFF CENTRAL CALIFORNIA

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Pollution by plastic particles is well documented in the Atlantic Ocean and has recently been reported from the Pacific Ocean (Colton et al. 1974; footnotes 11 and 12). Small polyethylene cylinders are used in the fabrication of plastic products and have been found in the effluent of plastic manufacturing plants (Colton et al. ibid.). Ingestion of plastic particles has been reported for eight species of fishes and one chaetognath by Carpenter et al. (1972); for Atlantic species of petrels, terns and gulls by Rothstein (1973) and by Hays and Cormons (1974); and for unidentified seabirds by Colton et al. (op. cit.). Bond (1971) found whitish or orange synthetic spheres in 20 Red Phalaropes *(Phalaropus fulicarius)* found dead on beaches of the San Diego area.

We have found polyethylene cylinders, styrofoam, synthetic sponge, small pieces of flexible food wrap, and pieces of rigid plastic in the stomachs of nine seabird species collected on Monterey Bay, California in 1974 and 1975. The most common items were polyethylene cylinders and other plastic items. Most of the cylinders recovered from the seabirds occurred as singles, but several agglomerations of two to four cylinders were found. The cylinders were buoyant in sea water, and the most common colors were white, brown, yellow, green and red. They ranged in size from 1 to 4 mm in diameter and 1 to 3 mm in depth. Most of the cylinders had rounded rather than sharp edges, indicating considerable wear (Colton et al. op. cit.). The wear may have occurred on the beach or in the stomachs of the birds. We did not find polyethylene cylinders or other plastic items in nueston samples from Monterey Bay, but pieces of flexible food wrap and styrofoam were regularly observed on the surface waters. The absence of polyethylene cylinders in the nueston samples and the rounded edges of the cylinders recovered from the seabirds indicate that the cylinders were probably not ingested in the Monterey Bay area. However, polyethylene cylinders have been found on beaches at Kalaloch, Washington and from seabird gizzards in the Aleutian Islands (Colton et al. op. cit.).

Potential problems for seabirds include intestinal blockages and toxic effects. Carpenter et al. (op. cit.) speculated that plastic particles might cause intestinal blockages. The high incidence of naturally occurring indisgestible items such as cephalopod beaks, fish otoliths, and pebbles in the stomachs of seabirds suggests that plastic particle pollution does not present an immediate problem; however, the abundance of plastics on the oceans will continue to increase for some time even if control measures are implemented immediately (Colton et al. op. cit.). Surface feeding species may be mistaking buoyant plastic particles for food, or the birds may be acquiring the plastic particles in place of pebbles which were commonly found, as well (Table 1). The continued accumulation of buoyant plastics in oceanic waters may eventually have a deleterious effect—possibly by mechanical interference with digestion; however, concentrations of 5 parts per million of polychlorinated biphenyls (PCBs) have been extracted from surface film on plastic spherules (Carpenter et al. op. cit.). The presence of toxic materials in or on plastics is probably the most serious potential hazard to seabirds.

Table 1. Number and frequency of occurrence of polyethylene cylinders, other plastic items, and pebbles in the stomachs of seabirds collected on Monterey Bay, California in 1974 and 1975.

		POLY-ETHYLENE CYLINDERS		OTHER PLASTIC ITEMS		PEBBLES	
	N	Number	Frequency	Number	Frequency	Number	Frequency
Short-tailed Shearwater *Puffinus tenuirostris*	6	119	100	11	71	24	29
Sooty Shearwater *P. griseus*	21	106	43	39	24	6	19
Pink-footed Shearwater *P. creatopus*	5	11	20	1	20	2	20
Northern Fulmar *Fulmarus glacialis*	3	23	100	11	100	16	67
Black-legged Kittiwake *Rissa tridactyla*	8	2	13	2	13	–	–
Glaucous-winged Gull *Larus glaucescens*	8	–	–	1	13	10	50
Heermann's Gull *L. heermanni*	15	1	7	1	7	27	13
Mew Gull *L. canus*	4	–	–	1	25	–	–
Rhinoceros Auklet *Cerorhinca monocerata*	26	–	–	3	4	1	4

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